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# Arch Continuity Through Endodontics*

*By*

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DENTISTRY has been defined as "the art and science of saving teeth." This definition is a noble sounding but completely inadequate statement of the fact. Any particular field of dental endeavor may have as one of its aims the saving of teeth, but now each field also concerns itself with the structures which support, invest, and otherwise come into contact with the teeth. These considerations make any isolated carious lesion, any inflamed gingival tissue, or any traumatic impingement just a single facet of the larger, more complex problem presented by the oral cavity.

Administering to the oral cavity is best and most easily accomplished through exercise of the old proverb, "A stitch in time saves nine." In no other healing art is such a small "ounce of prevention" worth such a large "pound of cure" as in dentistry. Instructing patients in oral hygiene prevents much periodontitis; early recognition and treatment of carious lesions prevent many pulp deaths; early orthodontic treatment prevents later, severe arch discrepancies; judicious endodontic therapy obviates the need for much oral surgery; and so forth. It is constantly being demonstrated in dental offices that preventive dentistry, when it can be practiced, is much kinder to the patient than reparative or replacement dentistry.

Though it was thought at one time to be an end in itself, as the aforementioned definition implies, saving teeth is now considered to be a means to a more comprehensive end —complete oral health. Endodontic therapy is the implementation of this means in its strictest interpretation. Endodontics is preventive by nature. Successfully carried out, it often obviates the need for disfiguring surgical procedures, reduces the necessity for making intricate restorative appliances, and lightens the load on abutments. Successfully carried out, endodontics can aid and abet good health, rather than tear it down, as believed in some circles.

Endodontists do *not* treat "dead" or "nonvital," teeth. A *"dead"* tooth has no place in the working dental arch—and *should* be removed because it can no longer function. Its *periodontal attachment* is largely destroyed, or its root and crown are beyond repair. In other words, there is no point in repairing a house that is about to fall over a cliff. But by the *same* token that it is ridiculous to burn down a house just because the carpenter dies, it is similarly *very* shortsighted to *arbitrarily* extract a tooth in which only the pulp has died. The primary function

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of the pulp is to "grow the tooth." Once this is accomplished, the pulp serves as little more than an alarm system for its own protection —hardly an essential function. Elimination of the nonfunctional pulp or pulp fragments and obliteration of the root canal under aseptic conditions allow the retention of the *"pulpless"* tooth as a member in good standing of the dental arch in most cases. Thus, endodontic therapy, by obviating the need for extraction of a tooth, makes unnecessary its replacement, with attendant involvement of adjacent teeth. If the crown of the tooth has been lost, the root can frequently be treated and filled so that a dowel restoration may be placed. I am firmly convinced that we shall see a resurgence of the art of making Davis or Richmond type crowns as a direct result of more adequate endodontic procedures.

With a well filled canal, an intact periodontal membrane, and the resolution of any periapical lesion, the *pulpless* tooth is as strong for all practical purposes as one with a vital pulp. Some men recommend that the incisal or occlusal surfaces of root-filled teeth be protected with overlays, or sometimes with complete coverage, because of the tendency toward brittleness after a while. However, these same men show no reluctance to use these teeth as abutments for fixed or removable prostheses. The situation is not at all rare in which the ability to retain a tooth with a root canal filling permits the use of a fixed restoration rather than a removable one, with all the latter's hazards. By the same token, maintaining a tooth in the mouth by endodontic means frequently spells the difference between *partial* and *complete* denture prosthesis.

Possibly the most valuable service which endodontists can perform is the prevention of that *first interruption* in the continuity of the dental arch, which is often followed by the migration of the adjacent teeth. Unchecked, this migration can lead to serious, widespread breakdown of the mutual support inherent in unbroken arches. As their contacts are relieved or broken, many teeth may start moving mesially or distally toward the gap; the over-all size of the arch may contract as the lips exert their pressure; or opposing teeth may encroach vertically upon the space. The combinations of results are infinite, and are nearly always detrimental to the esthetics and function of the dental organ.

Sometimes these migrations can be reversed or otherwise corrected through orthodontic procedures. In many cases, however, they are allowed to proceed to a point where further surgery and subsequent, large scale restorative measures are necessary to salvage the mouth. In a large percentage of these progressive breakdown cases, a very simple endodontic procedure might have prevented the whole tragic sequence. The younger the patient, the more important is this aspect; for, generally speaking, the greener the bone, the more rapid and more varied the migration of teeth.

Therefore, it would seem that there is room for rational, meticulously carried-out root canal therapy in many situations. I say *meticulous* because endodontics, like most other phases of dentistry, is as successful as the operator makes it. There are several effective technics. One involves the use of antibiotics; another uses electrosterilization. Several excellent filling materials are available, and more than one method of preparing the root canal can be used. Each of these obtains excellent results when basic principles are rigidly adhered to. A conscientious endodontist can obtain good results routinely with *any* of the technics; a sloppy, "disenchanted" operator will have difficulty making any of them work. I refuse to say that there is one "best" method of treatment; such a statement would be forcibly shoved down my throat in short order, for there *is* no *"shotgun"* approach to all endodontic problems. At the Naval Dental School, several methods of root canal decontamination are used; and at least three root-filling technics are employed. Each case is different and must be handled in the light peculiar to its own circumstances. However, irrespective of which

tooth is being considered, there is no substitute for thoroughness in carrying out individual phases of the total procedure. Haste predisposes to failure.

Prior to beginning treatment of any given case, the operator has largely determined the prognosis by the care with which he chose the case. In other words, differential diagnosis and awareness of contraindications for treatment will guide him to a wise selection of cases. Since no operator wishes to undertake therapeutic measures which are foredoomed to failure, he evaluates not only the pulp condition, but also the anatomy of the tooth, the anatomy of the surrounding structures, the health of the patient and the patient's attitude toward the treatment. He also considers the strategic value of the tooth in question. Occasionally it is better to remove and replace the tooth than it is to retain it, but this is not the rule when endodontic therapy is available. Should the tooth be saved? Let us examine a few typical situations.

Consider this situation (Fig. 1). A maxillary central incisor requires treatment, either endodontic or surgical. The dental arch is unbroken from end to end. Successful root canal therapy will maintain this arch continuity and prevent crown discoloration.

However, consider the same tooth in this extreme malposition (Fig. 2). Maintaining this tooth in its present position by endodontic treatment serves no useful purpose—esthetic, space maintaining or incisive. In my opinion, extraction should be the treatment of choice.

When it is necessary to construct fixed partial dentures in the anterior portion of the dental arch, esthetics, stability, and function must be carefully evaluated and balanced. In this case (Fig. 3), one maxillary central incisor is missing and the other has pulp involvement. If the latter can be retained, it will add greatly to the strength and stability of the replacement because of its larger, stronger, more firmly attached root. If it is removed and the roots of the lateral incisors appear to be undependable, the ad-

FIG. 1. Maxillary central incisor which requires treatment.

FIG. 2. A maxillary central incisor in extreme malposition.

FIG. 3. One maxillary central incisor missing and other has pulp involvement.


FIG. 4. Maxillary lateral incisors and one central incisor are missing, with involvement of other central incisor and cuspids.

visable course may be to extract the laterals also and to construct a six tooth fixed partial denture. This would be a sacrifice of three additional teeth which, in my opinion, is unjustified and preventable.

Here (Fig. 4), the maxillary lateral incisors and one central incisor are missing. The other central incisor is pulp involved, and the cuspids have a certain periodontal involvement. Extraction of the remaining central incisor, and suspension of a fixed partial denture from the none-too-stable cuspids, may result in a very short-lived restoration. Retaining the central incisor as an abutment in the middle of the curve from cuspid to cuspid will very likely provide the necessary support to make this a practical case.

A patient with this dental situation is rather severely handicapped during mastication (Fig. 5). The maxillary right quadrant is depleted except for a central incisor, a pulp-involved lateral incisor, and a first molar. The distance to be spanned by a replacement involves the cuspid—the turning point of the arch. A fixed partial denture extending from the molar to the central incisor is almost inconceivable because of the leverage created by the curve in the arch. Retaining the lateral incisor by means of root canal therapy for use in the anterior abutment reduces this leverage radically. Now a combination of the lateral and the central incisors appears feasible as an anchorage for this fixed partial denture, with careful consideration being given to balancing the occlusion in the lateral and protrusive excursions.

FIG. 5. Maxillary right quadrant is depleted except for a central incisor, a pulp-involved lateral incisor, and first molar.

It is generally conceded that fixed replacements, if they can be used, are preferable to removable replacements. Consider the situation in which all the teeth in a quadrant posterior to the cuspid are missing except a second molar with a dying pulp (Fig. 6). Retention of this molar makes a fixed partial denture possible; removal automatically necessitates a distal extension removable appliance.

Last, and far from least, we have the "last ditch stand" of a dental arch. All teeth are missing except the cuspids, one of which has

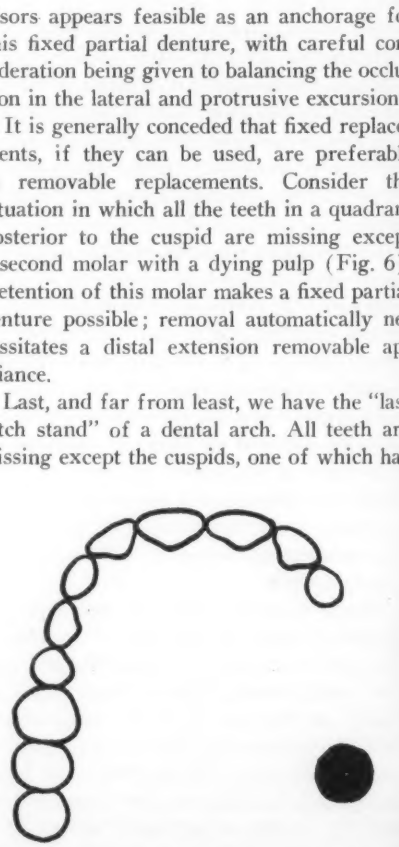

FIG. 6. All teeth in quadrant posterior to cuspid are missing except a second molar with a dying pulp.

a pathologically involved pulp (Fig. 7). If a removable partial denture is to be inserted in this situation, the ailing cuspid must be salvaged. If it is lost, a complete denture is the only solution to the problem.

Should the tooth be saved? No one can draw a blueprint answer for this question, for each set of circumstances is different from all others. Let it be stated, however, that endodontically treated teeth by the thousands are serving as anchorages for partial dentures, fixed and removable; are supporting Davis or Richmond type crowns, whose prime function is esthetic; or are acting as space maintainers. Let it be further stated that these functions are being carried out without the slightest danger to patients in whose mouths they are found if periapical healing is complete. Taking into consideration that under certain circumstances, almost any tooth we can name may be the foundation of a stable, comfortable chewing apparatus, *if it can be salvaged*, it is our moral duty as dentists to avoid sacrificing it as long as the patient's welfare benefits by its retention.

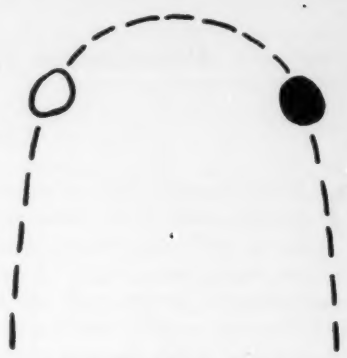

FIG. 7. All teeth missing except the cuspids, one of which has an involved pulp.

## SUMMARY

I believe that endodontic therapy is indicated for most pulp-involved anterior teeth, and for many posterior teeth, both maxillary and mandibular. I believe that its potential as a tool of preventive dentistry is without equal in the profession. I believe that it:

1. Can obviate the need for fixed or removable dentures, or for complete dentures in many cases.
2. Can often prevent arch disintegration and obviate the need for orthodontic treatment.
3. Can eliminate much unnecessary expense to the patient.
4. Can prevent much emotional trauma, particularly that following the extraction of anterior teeth.
5. Can promote good health rather than foster focal infection.
6. And will very shortly find its rightful status as a major weapon in the arsenal of the practicing dentist.

# Precautions in Biopsy Technique*

*By*

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DURING the year 1955 cancer caused 240,681 deaths in the United States. Cancer of the oral regions including the lips and oropharynx accounted for 3,275 or approximately 1.4 per cent of these deaths.[1] The lips, mouth, and oropharynx are, or should be, within the field of inspection of every dentist who conducts a thorough oral examination. The dentist, therefore, is in a very strategic position to recognize a suspected lesion occurring in these areas.[2] It is estimated that the annual cancer mortality could be reduced one third to one half by the early detection and eradication of all malignant lesions.[3]

The diagnosis of advanced cancer can usually be made by the experienced clinician without the aid of microscopic study. In its early stage, however, a malignant lesion may appear quite innocuous or may simulate other disease processes. This is especially true of oral carcinoma. Traumatic ulcers, tuberculous ulcers, and chancres in the oral regions may be confused with squamous cell carcinoma and vice versa. It is in this instance that the biopsy has its greatest value, for it alone is the single most conclusive method of confirming or establishing the presence of malignant disease.

The biopsy may be defined as the removal of tissue from a living patient for the purpose of microscopic examination and diagnosis. This definition implies the close cooperation between the clinician who removes the tissue and the pathologist who examines it. Inaccuracy in the diagnosis of a biopsy specimen may result from many possible sources of error, ranging from incorrect surgical technique to erroneous histopathologic study.[4] In view of this, and in view of the importance of the biopsy as a diagnostic aid, it is appropriate to discuss certain precautions which must be observed when performing a biopsy in order that the clinician who undertakes the procedure may receive maximum assistance from the pathologist.

The biopsy is a surgical procedure which should be carefully planned and carried out. As in all surgical procedures there are certain complications, such as secondary infection and excessive hemorrhage, which must be considered. The occasions on which these have been reported, however, are few, and most experienced clinicians and pathologists concur that when the biopsy is properly performed it is without serious consequence to the patient. In a series of 1,581 biopsies at the Oncologic Institute in Leningrad, Epstein and Fedorejeff[5] reported only two instances of severe infection and no severe hemorrhage.

Objections to the biopsy have been raised on the grounds that the procedure may disturb a quiescent lesion or may cause a malignant lesion to spread through the vascular channels which are opened up. While these possibilities exist, there is both clinical and experimental evidence to support the contention that they seldom, if ever, occur. Wood,[6] Hellwig,[7] Ewing,[8] Boyd,[9] Ackerman and del Regato,[10] and others have expressed the opinion that when the biopsy is properly accomplished, there is little danger of disseminating tumor emboli to distant parts. This danger may be further minimized by planning the procedure so that surgery or radiation therapy will immediately follow micro-

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scopic confirmation of the diagnosis.[11,15]

Novak[12] summarized the dangers associated with the biopsy in relation to its importance in the diagnosis of early cancer in this statement: "The danger of biopsy, if any exists, is far more than counterbalanced by the life-saving information it often yields. There is no other way of making the diagnosis in the early stages of the disease."

There is far greater danger associated with the injudicious manipulation of a malignant lesion than there is with the biopsy procedure. The experiments of Tyzzer,[13] and of Knox as described by Wood,[14] demonstrated that gentle massage increased the incidence of metastases of a variety of malignant tumors in laboratory animals. Boyle[15] cites two instances in which palpation of tumors of the palate by a group of students presumably resulted in the spread of clumps of neoplastic cells to the adjacent veins as demonstrated by histologic examination of the surgical specimens. Kilduff[16] quotes Liljencrantz, who also warned against excessive manipulation of malignant lesions, when he stated: "Properly performed biopsy is less dangerous than is rough handling or massage by a patient or physician." From the above it may be concluded that once the clinical impression of malignancy has been established and the decision to perform a biopsy made, excessive handling of the lesion should be avoided.

The contraindications of biopsy are practically nonexistent and those ordinarily given are really contraindications of certain types of surgical approach to specific tumors.[4] Pigmented moles and highly vascular lesions should never be cut into but should always be removed in their entirety with a margin of normal tissue. This is especially true of a lesion which is suggestive of a melanoma. Such a lesion should always be completely excised with a wide margin of clinically uninvolved tissue. A well encapsulated tumor should also be completely removed. Great care should be exercised in enucleating such a lesion, since perforation of the capsule may result in the implantation of tumor nodules in the surrounding tissue. This leads to a clinically apparent, persistent tumor, and it is often difficult to excise the seeded zones adequately.[17]

The method selected for performing the biopsy is governed principally by the location of the lesion. Surgical excision with the scalpel or "cold knife" is the method of choice for most lesions in the oral regions. From the viewpoint of the pathologist this is the preferred method because a specimen removed with the scalpel usually is the cleanest, least distorted, and most readily diagnosed.[3] The surgical punch or the biting forceps should be used only when the lesion is located in such relatively inaccessible areas as the base of the tongue or the posterior confines of the oral cavity. Proponents of the electrosurgical technique hold that this method reduces the chance of disseminating tumor emboli by sealing off vascular channels.[18] The electrosurgical method requires judicious handling and should be used only by those thoroughly familiar with the technique; otherwise the specimen may be "cooked" making histologic detail difficult, if not actually impossible, to evaluate. A compromise plan is to use the scalpel to remove the specimen and then lightly cauterize the resultant wound to destroy any loose malignant cells and seal off open vascular spaces.[19]

Surgical excision may be partial or complete, depending upon the size, location, and character of the lesion. Small, superficial, easily accessible lesions in the oral cavity, 1.0 cm. or less in diameter, should be completely removed. A partial biopsy is indicated when complete removal of the lesion is not feasible because of its size or location, or because the lesion resembles a tumor but may not be a true neoplasm. In a partial biopsy it must be remembered that the size, as well as the quality of the specimen, is important since the majority of inconclusive pathologic reports result from insufficient tissue being submitted for examination.[4] A narrow, deep specimen is preferred to a

broad, superficial one. A triangular wedge of tissue measuring approximately 1.0 cm. in length, 0.5 cm. in width, and 1.0 cm. in depth will usually provide the pathologist with an adequate specimen.

In a partial biopsy the site from which the specimen is to be removed should be carefully selected. A section removed from the margin of the lesion and extended to include a portion of the adjacent normal tissue is preferred. It should be remembered that ulceration, necrosis, or previous therapeutic measures may alter parts of a tumor, making microscopic interpretation of the tissue impossible or misleading.

Selection of the surface antiseptic must be considered. Seventy per cent alcohol is the antiseptic of choice. Deeply colored antiseptics, such as merthiolate or iodine, should be avoided, since they may interfere with the subsequent staining of the tissue.[11]

Most biopsy specimens of oral lesions may be obtained under local anesthesia. Anesthetics such as ethyl chloride or other solutions which produce anesthesia by freezing should not be used since they may cause serious cell deterioration thus decreasing the possibility of an accurate diagnosis. Anesthetics such as procaine or xylocaine are the agents of choice. The solution should be injected about the margins of the lesion, never into the lesion proper, thus avoiding undue tissue distortion.[11]

Care must be exercised when removing the specimen to avoid squeezing, tearing, or otherwise distorting the tissue. Instruments having multiple serrations or "teeth," such as an Allis Clamp or a hemostat, should not be used. Small, mouse-tooth forceps, such as an Adson thumb forceps, are recommended. The specimen should be firmly grasped at its normal tissue end and gently lifted out. If necessary, the specimen may be freed from its base by careful snipping with a small, pointed scissors.

If the specimen is very small, it is helpful to mark the tissue in some manner so that the pathologist will be able to section it in the proper plane. A piece of suture material placed through the specimen at right angles to the surface is a good method of assuring proper orientation. Lesions which have been completely removed should be accompanied by a topographic sketch showing the lines of incision. This will enable the pathologist to section the specimen through definite areas and report on the adequacy of the surgery.

Immediately upon removal the specimen should be rinsed in cold water and placed in the fixative solution. This is imperative and should be done even before the wound is closed. Too often specimens are placed on the bracket table and allowed to dry. Allowing the specimen to dry destroys histologic detail and makes microscopic interpretation difficult, if not impossible. If a suitable fixative is not immediately available, the specimen should be wrapped temporarily in gauze soaked with normal saline solution. It should, however, be placed in the fixative as soon as possible.

Ten per cent formalin (4 per cent formaldehyde) is the recommended fixative and should be used unless certain special staining of the tissue is desired. A widemouthed bottle, plainly marked with the patient's full name and containing a volume of fixative equal to approximately 20 times the volume of the specimen, should be used. If more than one specimen is removed from the same patient, separate bottles of fixative should be used and marked Specimen #1, Specimen #2, et cetera. If the specimen is to be sent to the pathologist by mail, the bottle should be sealed to prevent leakage or evaporation of the fixative. This may be done by adapting a strip of utility wax around the edge of the cap or by dipping the top of the bottle in liquid paraffin.

The biopsy specimen should be submitted to the pathologist with as much pertinent information as possible. This information should include: the name, age, sex, race, and occupation of the patient; the exact location of the lesion from which the specimen was removed; the clinical appearance of the lesion, including its size, shape, color, and consistency; the duration of the lesion, in-

cluding any recent changes in its rate of growth or color; the symptoms of which the patient complained when he first presented himself for examination; and any other relevant data, such as the results of laboratory studies, the presence or history of any systemic disease, a history of recent trauma, or previous surgical or radiation treatment. The clinician should also include a statement relative to his impression of what the lesion may represent. If roentgenograms of the lesion are available, these should also be submitted.

When the specimen is received in the laboratory, the pathologist must observe certain precautions in preparing the tissue for microscopic study. These, however, are technical problems and will not be discussed in this paper.

The pathologist's report is a detailed description of what he sees in the biopsy specimen when he examines it under the microscope. A certain amount of experience is necessary in evaluating the report. It must be remembered that the pathologist describes only what he sees in the tissue which he receives for examination. A negative report, i.e., no malignancy, is not necessarily conclusive evidence of the absence of cancer and should not be accepted as final if clinical signs of malignancy persist. In such an instance a biopsy should be repeated. If possible, the clinician and the pathologist should examine the patient together to determine the site from which additional tissue will be removed.

## Summary

Biopsy is the removal of a portion of tissue from a living patient for the purpose of microscopic examination and diagnosis. It is the single, most conclusive method of establishing the presence of malignant disease. When properly performed it is without serious consequence to the patient. However, certain precautions must be observed by the clinician who undertakes the procedure to assure that he will receive maximum assistance from the pathologist.

Surgical excision with the scalpel is the method of choice when obtaining a biopsy specimen from the oral regions. A specimen so obtained is usually the cleanest, least distorted, and most easily diagnosed. Surgical excision may be partial or complete, depending upon the size, location, and character of the lesion. Small, superficial, easily accessible lesions, pigmented moles, vascular lesions, and encapsulated tumors should never be cut into but should be removed in their entirety. In a partial biopsy, the specimen should be obtained from the margin of the lesion, care being taken to include a portion of the adjacent normal tissue. A wedge-shaped piece of tissue measuring approximately 1.0 cm. in length, 0.5 cm. in width and 1.0 cm. in depth will usually provide the pathologist with an adequate specimen.

Deeply colored surface antiseptics, such as merthiolate or iodine, should not be used to cleanse the biopsy site since they may interfere with the subsequent staining of the tissue. Seventy per cent alcohol is the antiseptic of choice.

The anesthetic agent should be injected about the margins of the lesion, never into the lesion proper, thus avoiding undue tissue distortion.

Care must be observed when removing the specimen to avoid squeezing or distorting the tissue. The specimen should be firmly grasped at its normal tissue end with small, mouse-tooth forceps and gently lifted out. It may be freed from its base by careful snipping with a small, pointed scissors.

The specimen should be placed immediately in 10 per cent formalin. It should be submitted to the pathologist with a detailed clinical description and history of the lesion.

A negative report from the pathologist should never be accepted as final in the presence of persistent clinical evidence of malignancy.

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# Basic Principles of Planning Dental Treatment*

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## INTRODUCTION

DENTAL treatment planning may be defined as the organization or shaping of a course of action designed to alleviate or eliminate one or more disease processes in the mouth and to restore and maintain the masticatory mechanism in a state of healthy function as related to the total patient. As a discipline of every-day practice, treatment planning is inseparable, yet distinctly different from the discipline of diagnosis. The two disciplines are inseparable because a plan of treatment without a diagnosis is futile, and a diagnosis without a plan of treatment is little more than an academic exercise. The two disciplines are distinctly different because diagnosis involves a process of elimination, whereas treatment planning involves a process of synthesis. A process of elimination eventually leads to one conclusion or diagnosis, whereas a process of synthesis may lead to an infinite variety of solutions or treatment plans. The particular solution or treatment plan developed by an individual for a given diagnosis will depend upon his judgment, and the quality of his judgment will vary according to his experience. Much of one's experience, of course, is the result of poor judgment. Treatment planning, therefore, is one of the most individualized and least systematized phases of dental practice.

Certain basic principles and objectives of treatment planning apply to all diagnoses, however. It is the purpose of this discussion to review those basic principles and objectives.

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## DIAGNOSTIC PROCEDURE

Early in his training the dental student is taught to think of dental service in terms of the individual tooth. Later he learns to think and plan in terms of the entire dentition. After considerable practice and continued study, he is able to make evaluations and treatment recommendations based upon his knowledge of the whole masticatory mechanism, including its muscles, nerves, joints and related structures. Finally observation and experience should teach him to relate all this knowledge to the needs of the total patient. It is self-evident that a realistic plan of treatment must take into consideration each of these four expanding dimensions of examination. This cannot be accomplished without routinely including certain questions and observations in the diagnostic procedure upon which the treatment is based. These questions and observations may be divided into four categories; 1) vital statistics, 2) the chief complaint, 3) the medical and dental history and 4) the examination of the patient. Too often a patient is seated in a dental chair and asked to "open please" without first securing this necessary information.

*Vital Statistics.* Those aspects of the vital statistics which most frequently influence the plan of treatment are the age, sex and occupation of the patient. Many dental operations are planned for younger individuals that are contraindicated in the aged patient. The difference in these plans is based to a large extent upon the patient's activity and dietary need. Cosmetic requirements vary with the sex of the patient and functional requirements vary with his occupation necessitating variations in the plan of treatment prescribed.

*Chief Complaint.* The chief complaint helps guide the choice of treatment because it often leads to a diagnosis that otherwise might be overlooked. A plan of treatment

that fails to correct the chief complaint invariably will be unsuccessful in the eyes of the patient. It also should be pointed out that the absence of a chief complaint may be helpful in planning a course of treatment.

*History.* A probing medical and dental history provides many valuable clues to a successful plan of treatment. Efforts to correct oral manifestations of systemic disease obviously would be irrational without a knowledge of previous and present medical therapy. Likewise, it would be foolhardy to attempt the correction of a dental complaint without knowing the results of previous dental experience.

*Examination.* The examination of the patient influences the choice of treatment in direct proportion to the completeness of the procedure. It is axiomatic that a plan of treatment will have greater likelihood of ultimate success when integrated with the total health care of the patient. The examination procedure, therefore, must include certain observations outside of the mouth. It is logical to make the exterior observations before proceeding to the interior because the approach to the patient in oral examination is from the exterior to the interior. Two types of exterior observations should be emphasized; the first is a gross appraisal of the patient and the second is a closer observation in the area of the head and neck. Those aspects of the gross appraisal most commonly having relationship to the plan of treatment are the speech, stance, gait, hands, temperature and personality of the patient.[1] The closer observations around the head and neck, having a more direct relationship to the plan of treatment, include symmetry of the face, function of the mandibular joints and palpability of regional lymph nodes. Proceeding to the interior, examination of the mouth itself will include the lips, buccal mucosa, palate, tongue, floor of mouth and investing tissues before proceeding to the ultimate source of most dental complaints, the teeth themselves. Although these steps in the examination procedure represent a logical sequence, their sequence is not so important as the avoidance of any omissions in whatever sequence is utilized.

## Objectives of Treatment

After collection and evaluation of the aforementioned data, the treatment plan should be directed toward accomplishment of three major objectives; 1) removal of the cause of disease, 2) restoration of function and 3) a durable response to treatment.

*Removal of the cause of disease* is necessarily limited to those oral conditions for which specific etiologic factors are known. An understanding of the etiology of a disease process simplifies the choice of treatment, since a specific agent or operation usually can be selected on a rational basis. Oral diseases which fall into this category include those due to physical, chemical or biological agents and those due to functional, nutritional and hormonal disturbances. Unfortunately the etiology of many other oral conditions is not known, however. Planning treatment for those conditions, must either be based upon empiricism, as in the case of metabolic and developmental disorders; selection of an agent which interferes with the disease process but which does not remove its cause, such as the use of enzyme inhibitors for dental caries and irradiation therapy for malignant neoplasms; or surgical removal of the lesion, as in the case of dental caries, cysts and neoplasms.

*The restoration of oral function* involves a consideration of articulation, expression and mastication. The relationship of the teeth to the functions of articulation and expression too frequently are overlooked. Oral defects and restorations that interfere with speech and appearance affect the well-being of a patient in the same way as any other physical disability, and their correction is as important as a plastic repair, for example, anywhere else on the face. Planning for the restoration of mastication should be based more upon preservation of the remaining dentition than upon restoration or replacement of its component parts. Restoration or replacement of individual teeth is of little

value if the remaining dentition becomes hopelessly involved with periodontal disease. The traumatic effects of occlusal disharmonies and removable appliances often contribute to the further mutilation of a dentition rather than to its preservation. Restoration of masticatory function in a dentition with missing teeth, therefore, is a complicated and challenging problem. Definition of a few principles are helpful in solving these problems.

The first principle is that a fixed restoration is preferable to a removable one in cases where the number and distribution of the remaining teeth will permit its construction. The reason for this is that a fixed restoration tends to stabilize abutment teeth, whereas a removable appliance tends to displace them.[2] A tooth that is splinted requires much less periodontal support than one that stands alone.

A second principle is that replacement of all 28 teeth is not necessarily required to restore adequate masticatory function. First molar distal terminal occlusion is sufficient for most adults. Second bicuspid distal terminal occlusion may even be sufficient for an older individual. Restoration of the dentition anterior to these teeth frequently can be accomplished with fixed replacements. However, distal terminal occlusion at the first bicuspid leaves no alternative to the construction of a removable restoration. In such distal extension cases, the prognosis of the abutment teeth is improved by splinting them to their closest neighbor.

A third principle is that the efficiency of the remaining natural dentition should be weighed against the efficiency of complete dentures in coming to a decision of whether to extract or retain the remaining teeth. Unless complete dentures can be made that are as efficient as the remaining dentition, the patient may become dissatisfied and blame the dentist for his oral disability.

*A durable response to treatment* is a desirable, but occasionally an unattainable, objective of treatment. The durability of treatment is the final test of the favorability of one plan of treatment over another. Obviously the most favorable plan is that one which will provide the greatest number of years of healthful oral function. An estimation of the expected response to treatment, or the prognosis, is an integral part of the treatment planning procedure in all phases of dental practice. The vital statistics and the medical and dental history are particularly important in making a prognosis. Oral findings may be similar to two patients, and yet it is a common clinical experience for the same treatment plan to be favorable for one patient and unfavorable for another. Advanced age and the difficulties of readjustment that accompany this period of life influences the liklihood of successful prosthetic service. Poor health and lowered resistance due to debilitating disease reduce the probability of successful periodontal and endodontal therapy. A history of neglect or an attitude of disinterest on the part of the patient reduces the liklihood of success for all types of dental service. A poor prognosis because of a lack of interest may be altered by patient education, but it still must be recognized that there are some patients whose habits and sense of responsibility cannot be controlled. And finally, the experience and technical ability of the operator are important considerations in making a forecast of the probable outcome of a course of treatment.

### Sequence of Treatment

After a treatment plan has been developed to meet the three objectives mentioned the final detail in the planning procedure is to arrange the various elements of treatment in their proper sequence. The usual sequence of treatment for dental disorders is as follows:[3]

1. Provision for medical evaluation and therapy of systemic conditions having relationship to the oral problem in question.
2. Treatment of acute oral conditions.
3. Coronal debridement.
4. Oral surgery.

5. Periodontal treatment.
6. Endodontal treatment.
7. Restorative dentistry.
8. Removable denture prosthesis.

This sequence is so arranged that each step has an effect upon one or more of the succeeding steps in the sequence. For example, it is important to make provision for medical evaluation and therapy of any systemic condition having relationship to the oral problem in question before, not after, dental treatment has begun. Otherwise the entire dental treatment plan developed may end in failure. Management of acute medical and surgical conditions falling within the scope of dental responsibility, of course, should take precedence over other phases of dental treatment because of their emergent nature. Coronal debridement or prophylaxis should be accomplished early in the sequence of treatment since it facilitates the accomplishment of restorative work and reduces bacterial flora of the mouth making post extraction infection less likely. Removal of teeth and surgical preparation of edentulous areas likewise should be done early in the sequence to permit observation and healing to occur while continuing with other necessary treatment. Also, periodontal and endodontal therapy should precede the restorative phases of treatment since failure in either will alter the choice of restorative service. Similarly, when a combination of fixed and removable replacements for missing teeth are contemplated in the same dentition, it is better judgment to complete the fixed before starting the removable.

There are few instances in which deviations from this sequence of treatment are desirable or necessary. A random sequence occasionally may be successful, but a little time spent studying the effect of one treatment procedure upon the next will forestall wasted motion and prevent many time consuming mistakes.

## Summary

The influence of vital statistics, the chief complaint, the dental and medical history, and the examination procedure upon a plan of dental treatment are reviewed. The overall objective of treatment and the sequence of their accomplishment are discussed.

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# Periodontia Residency Program in a University Affiliate Hospital

*By*

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A PROGRAM for residency in Periodontia should be organized so that it is a distillation of the finest concepts of modern hospital training. It should be a progressive and graduated educational experience adapted to the professional requirements of the resident and prepare him for specialized private or hospital practice, for research and for teaching. The training should be so delineated that most of it is obtained within the hospital confines and supplemented by university courses. It should encompass and capture the best a modern university affiliate hospital can offer. Yet it should be flexible enough to meet the personnel requirement of the resident for postgraduate university and hospital training. This is necessary since the background of the resident, his maturity and his objectives will vary.

The massive loss of teeth through periodontal disease constitutes a major problem in modern dental practice. More teeth are lost by periodontal involvement after the age of 35 than from any other cause. With a population which is living longer, retention of natural teeth and elimination of oral disease assume greater importance. The inefficiency, the cost, and the inconvenience of exodontia procedures and the artificial substitutes for the natural dentition increase the importance of periodontal care and retention of the teeth.

In our hospitalized population, periodontal disease is rampant. A virile program for its control, treatment, and elimination is bound to result in a more comprehensive health service and speedier recovery. Conversely, systemic ailments place their mark on the health of the gingival and oral mucosal tissues. The teeth, the bone, the gingiva, the connective tissue are part and parcel of the individual and must be retained in good health as part of the patient's over-all therapy during hospitalization. In the face of this endemic disease, the sobering fact that periodontal disease is correctible, inescapable.

A periodontal residency program is one way of focusing attention on the problem of improving the periodontal health of the hospitalized patient. But periodontal residencies are new in hospitals. Initiating such a program constitutes a challenge, especially since it means parting with tradition and cutting through the hampering influence of habit and well traveled pathways of thought. The need, however, is vital and so evident!

Just what are the advantages of an elaborate program of residency training to a hospital? This is an important consideration, for if we are to train men who leave the hospital and derive no benefit or merely meagre benefits during their stay, we may be subject to just criticism. The benefits of a good residency program in periodontia are so ubiquitous as to pervade every facet of our medical and dental mission.

First, the patient will be given a more comprehensive dental service since the entire dental staff becomes better trained and more alert. The association of the periodontia residents with the regular staff, the teachings of the consultants and attending staff members, the affiliation with the university result in a better trained staff. Remember, a dental group working together, 52 weeks a year tends to stagnate and may become professional vegetables unless stimulation in professional thought and growth is provided in a positive fashion. A residency program in periodontia does just this. The young resident discusses, asks questions, and shows his

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patient to other members of the staff. This provokes thought, discussion and pride in the knowledge of underlying pathology and of good dentistry.[1]

Second, the periodontal health of the patient in the hospital will be getting fuller attention. Where formerly periodontal disease in patients may have been treated with the cold forceps and artificial restoration, now the disease can be treated and the teeth retained. With proper home care and periodic visits for maintenance, the patient can retain his teeth for life. Without periodontal care and training, the patient would visit his dentist sporadically after discharge from the hospital, perhaps for extraction and artificial replacements. Now, with training, he visits his dentist regularly for prophylaxis and maintenance. With a periodontal residency program at a hospital, the dental health of the patient is among the best in the community.

Third, the resident himself performing on patients contributes to the over-all output of the clinic. At least 60% of his time is spent treating patients. Further, since the American Board of Periodontology does not require exclusive practice of periodontia, and rightly so, the resident will construct bridges, partial dentures and fillings for his periodontal patients, considering primarily the present and future health of these tissues.

Fourth, the periodontia residency program forms an important bridge to the community, to the dental profession and to the University. The criticism has been leveled against full time dentists that they reside in ivory towers, devoid of professional stimulation. A periodontia residency program is a stimulus for improved periodontal care by the private practitioner since the patients leave the hospital well versed in the need for maintenance of the periodontal structures. They spread the gospel to their family and friends who in turn go to the private practitioner asking for such services. The hospital develops a better reputation in the community in providing the epitome of good periodontal care.

Fifth, the training of the medical resident and other physicians at the hospital is advanced. It is well recognized that at medical schools the teaching of diseases of the oral cavity is meager. Most physicians look upon dentistry as having no specialties or, if any, possibly oral surgery or orthodontia. Gingival disease, to many, consist solely of "trench mouth," which should be treated by gentian violet and antibiotics. With a periodontia residency program the close association of the residents at seminars, lectures, in the dining room, and even in the corridors, focus attention on the service that may be rendered to the patient when they are maintained in good periodontal health. The differences in theology and discipline will gradually disappear as we treat the patient as a whole.

Finally, the most important person in a hospital is the patient. How does he react to a periodontal residency program? It has been found that the patient's response is gratifying. For the first time in his life, a complete periodontal service is made available to him. The medical and dental history, the roentgenograms, the study casts, the kodachromes, the diet analysis, the home care, the treatment planning, the equilibration of occlusion, the removal of the irritants impress the patient with the meticulous and comprehensive care he is receiving. There is a feeling of well-being that comes with a healthy periodontium, and the patient senses the superiority of this type of servce. This, too, is the reward to the hospital.

The teaching of periodontia has gone far since the days of Riggs. Instead of thinking in terms of one disease, pyorrhea, we now recognize several different entities. The etiology, pathology, and treatment have been carefully studied, and it can be said without fear of contradiction that there are few diseases that are more easily prevented and more satisfactorily treated than periodontal disease. It is only after years of neglect that the disease becomes so far advanced that therapy becomes hopeless. As taught today, periodontal disease is preventable and curable.

But in the teaching and practice of periodontia, the etiology and pathology of the

disease spill over and are intimately affected by systemic disease. As has often been stated, the oral cavity cannot be disassociated from the rest of the body. So in the teaching of periodontal disease, the systemic diseases that have oral manifestation are of great importance. Recently, a patient was referred to our hospital for an alveolectomy. The patent, on even superficial examination before sitting in the chair, appeared to have Paget's Disease. This was confirmed by roentgenography, blood chemistry, etc. One of the characteristics of Paget's is an expanding maxilla with spacing of the teeth. Again to illustrate, practically every week a consultation will be requested by the physician of a patient suffering from any of the leukemias or erythema multiforme, or herpes or pemphigus, with the request that we do something about this man's gums. Obviously, the periodontist should be familiar with the management of the oral manifestations of these diseases. Even in cardiology, the present vogue of using dicumerol anti-coagulant therapy for months and years on ambulatory patients recovering from coronary or cerebral thrombosis poses a problem of hemorrhage in periodontal therapy. Numerous other examples of the relation and effect of systemic diseases on the oral cavity can be given.

Approximately two or three times per week, in a large General Medicine and Surgery hospital like New York, the dental service receives a consultation of a lesion in the oral cavity, which the physician views with suspicion and about which the patient by the time he reaches the dental service is thoroughly alarmed. Upon examination, this lesion very often is found to be a large but normal circumvallate papilla of the tongue or a traumatic ulcer or recurrent herpes, or benign neoplasm; but on occasion, the lesion appears to have the characteristic of a malignancy. The specialist in periodontia should possess the training in neoplastic diseases so that he is competent to recognize them early. It has been variously estimated that from 5% to 7% of all malignancies occur in the oral cavity. The periodontist, therefore, must be well versed in oral medicine since he receives referrals from other dentists and physicians and is relied upon as the last word in diagnosis.

Just what do we teach and what do we expect the resident to learn during a two year period? He is taught at the Hospital and at the University—anatomy, physiology, biochemistry, and pathology of the gingiva, the periodontal membrane, the cementum and the alveolar bone. These are related to every day clinical practice. Gingival diseases caused by local factors and systemic factors are evaluated. The entire field of manifestations of dermatologic diseases in the oral cavity is presented. The clinical aspect and histopathology of the various periodontal pockets are related to the basic disease factors. Special stress is placed on the etiologic factors in periodontal disease grouped under local, dysfunctional, and systemic. Such studies as the epidemiology, the microbiology, the endocrinopathies and cardiovascular disease in relation to oral disease are presented. The role of calculus, microorganisms, traumatic occlusion, food impaction, malnutrition, malocclusion, restorative dentistry, endocrine and hematologic diseases and their influence on periodontal disease are clinically integrated. Related to this are prognosis, treatment planning, instrumentation, pocket eradication, oral function, pharmacology and rehabilitation, which are performed in the dental clinic.

The primary location for the coordination of all this activity is in the Dental Service where the resident spends at least 60% of his time during eight months of the school year and all of his time for the remaining four months. The dental clinic is the hub or the heart where all the basic science training is integrated and coordinated. It is here where the periodontal services are performed.

Apart from the many traditional disciplines in basic science in relation to periodontia, the resident must develop certain concepts such as diagnostic powers of observation, a concept of normalcy and objectives of

periodontal therapy that come only from extensive supervised clinical practice. For this reason, a good residency program should provide ample time, facilities, patients, and most important—supervision in clinic training. Again, it is here that the basic science, taught didactically by Ph.D.'s and M.D.'s, is applied to every day periodontal problems. This daily integration of the sciences with clinical periodontia to attain such concepts can only be done by the intimate contact with and daily supervision of one experienced in periodontia. There is no substitute for this type of integrated and supervised clinic training.

These concepts obtained in the dental clinic are not nebulous but real and of vital importance. Let's examine some of these! The periodontal resident must develop his sense of observation so that he can arrive at the proper diagnosis. One cannot treat what he cannot see! This training in observation must be developed and refined in constant every day practice. Casual or routine observation yield only superficial information which has but limited value. In periodontal therapy, diagnosis is of prime importance. Success in therapy comes only with the ability to recognize and eliminate the etiological factors. For the casual observer, the causative factors in the disease do not appear to exist, although actually they are present and waiting to be discovered. Observation is a prime requisite of diagnostic acumen which a two year residency program in periodontia should foster. To accomplish this, the resident must be under constant preceptorship and surveillance of one well trained in periodontia.

Another concept he must develop is a recognition of what is normal health among the periodontal tissues of bone, connective tissues, epithelium, etc. In the treatment of periodontal disease, elimination of the etiological factors requires an intimate familiarity with the normal tissues. It is of prime importance that the therapist have a first hand knowledge and establish the nature of what is normal healthy periodontium. This is not easy since there is no single standard of health. Health and normalcy are not a finite mathematical concept but represent a range of variation within which health exists. Further, what is health for one age and one person may represent disease in another. Normalcy and health are determined by color, texture, form, tooth mobility, esthetics and architecture of the tissues. The resident should have his training in anatomy, histology, nutrition and chemistry integrated into the concept of normalcy by one well versed in periodontia

In planning and conducting a periodontia residency program, the objectives of periodontal therapy must be ever present in our minds. Only then can we justify the program and have a yardstick by which to measure the attainment of these objectives. There are various techniques that are taught and are being used by competent periodontists, and when discussed are marked by extreme emotional outbursts. The resident will later be exposed to these various techniques and he should be competent in evaluating them. They all vary markedly, but the results attained should conform to the objective. This is to eliminate disease, to bring about repair of the tissues and to re-establish function and maintain this condition as long as possible.

It is of prime importance, therefore, that the resident should explore more than one technique so that he can properly evaluate other procedures. The advantages and disadvantages should be maturely discussed. He should know that individual methods and techniques presented are adaptable to special situations and merely the tools of a mosaic which help him attain the objectives. He should exploit the advantages of each technique and use the one that helps him obtain the objective of periodontal health in his patient.

The American Board of Periodontology has taken a magnanimous view concerning the limitation of practice to the surgical and prophylactic procedures exclusively. Recognizing the fact that a "practice limited exclusively to surgical and prophylactic treatment

of periodontal tissue alone is inadequate without treatment devoted to restoration of occlusion, support and functional anatomy of the teeth,"[2] the American Board of Periodontology has gone a long way to advance the cause of good clinical general dentistry. In the clinic, the resident receives advanced training in executing the supplementary operative, crown and bridge, and prosthetic procedures on his patients in a manner best suited to support the periodontal services. In this way, should he desire to refer this treatment to others later in his career, he would be in a more strategic position to superintend their treatment. Too often, men go into specialties of medicine or dentistry without having been in general practice and lacking intimate knowledge of the problems. Too often, a periodontist refers a patient to a general practitioner for full cast crowns as a means of permanent splinting of several loose teeth, when these teeth are so tilted, so situated, and so maloccluded as to preclude successful splinting. If the periodontist had done this sort of prosthetic technique himself, he could have easily predicted the outcome. A resident, having done the supplementary procedures in operative dentistry, crown and bridge, and prosthodontia, can more skillfully direct and judge others in their execution of this facet of therapy.

In the teaching of the clinical management of periodontal problems, stress is placed on an understanding in terms of underlying tissue changes. It is well recognized that all clinical periodontal problems are basically gross expression of microscopic tissue changes. The physiology, the chemistry, the pathology of these microscopic changes are carefully integrated into clinical teachings. An appreciation is gained of the extent to which the initiation of periodontal disease and its reversal to health is interpretable by oral pathologic changes.

A pitfall that a Periodontia residency program and perhaps other residency programs may fall into is to assign the resident for weeks or months to other departments in the hospital such as medicine, surgery, or anesthesiology. What happens here is that the resident is expected to participate in the same activities and routine as the medical resident, rather than adapt the training to his particular needs. The periodontal resident becomes lost in a maze of minutia related to fields other than his own. This is to be expected inasmuch as the other departments have their own residency programs and do not gear their schedule to the needs of the periodontia resident during his short stay in that department. This is a common procedure, and although it may be acceptable, it is not a well-integrated training program.

The more valuable procedure is to instruct the resident to attend the teaching conferences, lectures and seminars of other departments, rather than to assign him and perhaps lose him for weeks or months without proper supervision or integration. In this way, the periodontia resident can place the other specialties and disciplines of medicine in their proper perspective and not get lost in any one. Coordination of the systemic factors and basic science, to have full meaning, must go on all the time in the dental clinic under direct guidance of one certified in periodontia.

The one place that the various disciplines are put to the test is in clinical practice. This clinical training must take place in the dental service. Let me illustrate!

A short time ago, I interviewed a resident applying for periodontia training. He stated that he had a year's internship and that during that internship, he had nine months of anesthesia. Three quarters of the time of internship was spent administering general and local anesthesia in the operating room and away from the dental service. This was an internship at an acceptable and well-known hospital, but it was so unbalanced that the program had not advanced the dental training of this man very much.

Since the Dental Service is the center of his training, the resident in periodontia must feel he is a part of the Dental Service and not on temporary detail. This sense of belonging to the service is most important and

relates to such things as ordering supplies, rapport with the dental technicians, efficiency of the dental assistants. As the ex-convict who was recently caught in an Eastern city said succinctly, "I'm glad to go back to jail. Outside I'm nothing, but up there, I am first baseman on the baseball team."

How do you give the resident a sense of belonging rather than a feeling of being on the outside? There are some very definite things that can be done to overcome the fact that he is with you for a year or two. One way is to provide him with a good, competent dental assistant. Just as in oral surgery, a dental assistant is assigned to the surgery clinic exclusively, so in periodontia, a dental assistant is assigned to full time. She becomes experienced and trained in periodontal technique, instruments and terminology. She assists in history taking, charting of pockets, tone, color of tissue, diet analysis, toothbrushing instruction, and pouring casts. She arranges and maintains the charts and periodontal instruments, and assists in maintaining the proper professional decorum. A special section of dentistry is being created, and the resident must feel he is an integral part of it.

As funds become available, the resident should be asked if there are any materials or instruments he would like to order or any additions to the medical library that he would like to see made. Are his quarters in the hospital and meals up to par? Is he getting his proper cooperation from the dental laboratory, the clerical, and other personnel? Are the other medical services working with him in this therapy? Is the University training meeting his needs? Further, as the training advances, teaching assignments should be made in the undergraduate clinic of the Dental School; and because of a tight schedule, it has been found that Saturday morning is a good time for this. The Chief who concerns himself with these problems, through regular conferences with the resident, will find the periodontia residency program more rewarding, the resident more devoted and loyal, and the patients getting the very best in dentistry.

Since different periodontists have varying techniques, an affiliation such as is provided by consultant and attending staff members helps to round out the program. To put it another way, the clinical practice of periodontia at the present stage of its development is as much an art as an exact science, just as the clinical practice of medicine is. Any residency program which ignores this distinction is bound to be unreal. While there are certain tenets and principles that make prognosis predictable, there is the art of practice which comes only with sufficient supervised clinical practice over a period of years. It has been found valuable to invite the consultants and attending members and others to the dental clinical pathological conferences, to journal club meetings, review of case reports, and other regularly scheduled seminars. Here they can be asked to express their views on periodontal problems. This is real pedagogy!

In summary then, good periodontia residency programs do not accidentally fall together. They have to be carefully planned. The program must be definitely outlined, maturely administered and wisely supervised. It then becomes a very rewarding experience.


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# The Effective Utilization of Auxiliary Dental Personnel

*By*

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DENTISTS of the Federal services can point with justifiable pride to the contributions they have made to the advancement of the standards of their profession. Considerable progress has been made in Federal programs in the development and perfection of new technics, equipment, and materials, and in the research and public health aspects of dentistry.

Not the least of these contributions has been in the development and promotion of more complete utilization of auxiliary personnel by all the Federal dental services. The practical application of more effective utilization of auxiliary personnel in the various Federal dental programs has been at least partially responsible for stimulating increased interest in the subject among private practitioners. The demonstration studies conducted at Richmond, Indiana, and Woonsocket, Rhode Island, by the Public Health Service, the use and maintenance of minimal dental auxiliary position requirements by the respective military services, and the increased use of auxiliary personnel by the dental departments of the Public Health Service and Veterans Administration have had a marked influence on the progress that has been realized in expanding the use and effectiveness of auxiliary personnel generally.

Today, no one would question the need for additional dental health services in this country. The need is urgent, and is well documented by statistical data which point out the degree of urgency.

First, consider the nation's present economic position. The fact that our economy is at one of the highest levels in our history is a factor which has considerable influence on the demand for dental care services. This demand is rising with the rapid increase in our population. The problem of meeting national dental needs is further complicated by the "cold war" and the demands for professional manpower which this generates. There is a consequent necessity for maintaining a fair balance between dental care services provided for the civilian and military populations and those provided for armed forces personnel. It has been estimated variously that the number of dentists required to meet fully the existing dental health needs of the population should be doubled, tripled, or even quadrupled. The possibility of such an increase in the number of dentists in the foreseeable future, of course, is remote. The number of registered civilian dentists in 1950, according to the American Dental Association Directory, was 87,800. By 1955 the Directory recorded 90,234, or an increase of only 2,434. During the period 1950 to 1955, the number of federally employed dentists increased from 2,575 to 7,290. The increase in the total number of dentists has not been proportional with the population increase.

Obviously, the dental profession is obligated to exploit all ethical means of increasing its capacity to provide quality dental services. One of the most rational and noncontroversial means of increasing this capacity is through more widespread use of auxiliary personnel, and more complete utilization of their training and abilities.

There is good reason to hope that future generations will not be faced by a dental problem of the magnitude of the one facing us today. The fluoride methods for preventing tooth decay have opened up broad new horizons in the field of dental health, offering the possibility that caries can be reduced from 40 to 65 percent on a community-wide scale, and eventually perhaps even on a state wide and nation wide scale. However, even

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if these effective preventive methods are adopted universally, the need for dental care services still will greatly outstrip the capacity of the dental profession to supply them unless new and improved methods are employed.

The ability to increase markedly the capacity of the dental profession to provide service is the most important aspect of complete utilization of auxiliary personnel. Consequently, in keeping with the theme of this session of the Association of Military Surgeons—"Professional Excellence" —effective utilization of auxiliary personnel must be considered in the light of its real importance.

According to the latest information available,[1] the Navy maintains a ratio of 1.5 dental assistants per dentist; the Army, 1.5; the Air Force, 1.54; and the Veterans Administration, 1.2. The Public Health Service varies from .54 to 1.5 per dentist according to the particular activity concerned. The Veterans Administration and Public Health Service have been handicapped in maintaining consistent dental assistant staffing due to the unrealistic Civil Service salary scale. It appears at this time, however, that an early correction of this deficiency will be achieved.

There are certain factors which contribute to the reluctance and failure of the dental profession to use auxiliary personnel more readily and effectively. First is the very limited appreciation by many dentists of the real value of complete utilization of trained auxiliary personnel. This may be due, partially, to the professional training of the dentist. During his undergraduate training he acquired the habit of doing everything for himself incident to patient care—a habit which, in most cases, persists throughout his professional career.

In contrast to the dentist, consider the physician. During his internship, he is "well exposed" to auxiliary personnel, and as a result he becomes very dependent upon their aid and support. Using them, he is able to augment his services tremendously.

This lack of experience on the part of dentists in proper utilization of auxiliary personnel points up the urgency of incorporating in the dental college curriculum some practical training for the undergraduate in the use of dental assistants. Fortunately, some of the dental colleges of our leading universities have adopted such a policy, or are in process of adopting it. Currently the Public Health Service is sponsoring experimental programs in six dental schools. This, indeed, is a forward step inasmuch as it is logical to assume that dental students who have had the advantage of some training in the use of assistants will continue after graduation to utilize auxiliary personnel more fully.

Another factor which frequently discourages a more widespread use of dental assistants is the frequent turnover of auxiliary personnel in the dental office. While many dentists prefer to train their dental assistants, such a procedure becomes impractical and economically unsound with a frequent turnover of personnel. As in most other professions, economics plays an important role. The average dentist will not increase the expense incident to additional personnel unless it can be proved to him that such an expansion is a sound investment.

Of course, complete and efficient utilization of auxiliary personnel often depends on an adequate ratio of auxiliary personnel per dentist in order that chairside assistance and other office duties can be carried out concurrently. The results of surveys[2,3] indicate that, in general, the income and overhead of independent dentists vary according to the number of chairs and the number of employees of specified type. A very limited experience with well-trained, effectively utilized dental assistants will demonstrate conclusively the economic soundness of such expansion. Any planned expansion of personnel and facilities must be based primarily on sufficient demand or potential demand for dental care services. While the economic return is not a controlling factor in the utilization of auxiliary personnel by Federal agencies, nevertheless they are obliged to utilize such personnel to the maximum potential in order to satisfy the needs of their respective beneficiaries in the most efficient and effective manner.

Maintenance of the optimum ratio of aux-

iliary personnel to dentists is not enough. Such personnel, to be effective and economical, must be completely utilized for their primary function—to conserve the dentist's time. Unfortunately, a relatively small number of dentists employing assistants utilize them to their full potential effectiveness.

This is not an accomplishment which comes easily, however. It is not simply a matter of employing more dental assistants and then trusting to luck. The near ideal situation can be realized only after analyzing each type of dental operation to find out just which segments of the work should be delegated to assistant personnel. In addition to a work analysis, a number of other conditions must be considered if chairside assistance is to be really effective.

First, the dentist himself must have a broad working concept of how to use assistants to their fullest capacities. This is a concept which he develops only by observing and actually working with experienced chairside personnel.

Second, the assistants must have a detailed knowledge of what their duties are and how they should be performed.

Third, the dentist and his assistants must strive constantly to achieve a smooth-running system of teamwork. The auxiliary personnel should, in effect, develop themselves into extra pairs of hands for the dentist, making their every action a time-saver for him. He, in turn, must have a constant awareness that he is no longer a unit unto himself, and that his assistants are absolutely indispensable to his work.

Fourth, the layout of the dental office and the equipment must be conducive to this type of teamwork. For instance, a dentist with at least two dental chairs and duplicate sets of instruments, plus adequate assistance, can minimize greatly the loss of time between patients.

And fifth, the dentist who wants to increase the quantity of his services must have a constant supply of patients on hand.

In a brief presentation it is not possible to justify adequately the importance of other auxiliary personnel to the dental profession. The large central dental laboratory service is apparently most practical in the Federal agencies. Relatively few private practitioners find it practical to employ their own technicians in view of the fact there exist so many fine laboratories providing rapid high quality service.

Unfortunately, dental hygienists have not been utilized extensively in the Federal services; this condition may be partially attributable to Civil Service pay scale restrictions. The current maximum salary scale does not compete with the incomes available to the dental hygienist in private practice. It is incumbent upon the Federal services to do everything possible to attract qualified hygienists and utilize their services to provide efficient and economical dental programs.

Since the Federal services in most cases have available all the conditions considered essential to maximum utilization of auxiliary personnel—speaking specifically of dental assistants—it is the responsibility of the agencies concerned to exploit this method of increased care services to the fullest. The ultimate in excellence of *utilization* of auxiliary personnel never has been reached; there will always be new and better methods and more ways in which the services of such personnel can be utilized.

We have a responsibility to the dental profession to lead the way in this endeavor, to assist in developing training programs both within and outside the Federal Government, and above all to thoroughly inculcate the young dental officer with the importance and necessity of full and complete utilization of auxiliary personnel as an essential element in his ambition to attain "professional excellence."


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# Problems in the Dental Care of Long Term Patients*

*By*
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THE dental care in the management of the long term patient is of paramount importance to the Veterans Administration Dental Service, since more beds in the VA Hospitals are occupied by either neuropsychiatric or tuberculous patients in addition to many other types of long term patients. In our service, the long term patient can be brought under two headings: (1) the young patient and (2) the old or geriatric patient.

The problem varies somewhat in handling the two types of long term patients, the young patient primarily has a dentition consisting of many teeth while the geriatric patient is chiefly a prosthetic problem. In recent decades the scope and the accomplishments of dentistry have increased whereby the dentist is concerned not only with restorations, and prosthetic dentistry, but also with the human organism. Teeth must be considered in health and disease in terms of their effect on the organism as a whole. Sir William Osler recognized and stressed the significance of the oral cavity as a "mirror" of the rest of the body.

Maintaining good oral and dental hygiene for the young long term patients is many times difficult when patients are unable to, or refuse to brush their teeth regularly, thus defeating the purpose and practice of dental hygiene. The brushing of the teeth is to keep the surfaces free from foreign matter and also to compensate for faulty food habits. Since diets are mostly soft and furnish a minimum amount of friction upon the teeth, accumulations of food remnants upon their surfaces must be removed by artificial means. The use of the toothbrush not only adds to the comfort of the patient, but greatly improves the appearance of the teeth. It also reduces the number of mouth organisms and is an effective instrument in treatment of halitosis and many oral conditions.

Some of the problems encountered by patients who fail to maintain good oral and dental hygiene are dental caries, gingivitis, injuries from occlusal disharmony, trauma and periodontal disease.

Dental caries is most frequent in its inception and most ravaging in its progress during childhood, adolescence, periods of unusual physical and nervous exhaustion and senility. Caries of the teeth may be classified as restorable and non-restorable. Restorable caries in teeth can be removed and suitable filling materials inserted. The non-restorable type carious tooth, depending on the length of time, may result in abscess formation, granuloma, or cyst occurring at the apices of the teeth. Here extractions are indicated and surgical removal of the pathosis is necessary.

Gingivitis is the earliest manifestation of inflammation in the superficial periodontal tissues. Individuals are subject to gingivitis at any period of life but its occurrence is most frequent in adult life. Little discomfort is experienced by the patient in the early stages of gingivitis and it generally remains neglected until it has progressed sufficiently to cause considerable damage to the supporting tissues. Gingivitis does not always progress to suppurative periodontitis or pyorrhea but usually pyorrhea is preceded by gingivitis. The etiology of gingivitis may be divided into four general classifications: gingivitis due to mechanical irritants, gingivitis due to dental calculus and lack of mouth hygiene, gingivitis due to infection, and gingivitis associated with systemic disorders.

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### Gingivitis Due to Mechanical Irritants

Gingivitis caused by mechanical irritants can be classified in the following manner:

1. Food impactions caused by imperfections in tooth form and malposed teeth which are responsible for approximal contacts that harbor food during mastication and cause pressure on the soft tissues.
2. Imperfect contour of teeth caused by carious defects and imperfectly unfinished restorations with rough and projecting edges of inlays, fillings and crowns with the gingival tissues.
3. Traumatic injuries to the soft tissues that are continually repeated and result in inflammatory or degenerative changes in the periodontal tissue.

### Gingivitis Due to Dental Calculus and Lack of Mouth Hygiene

Gingivitis due to dental calculus is little different in its inflammatory reactions from gingivitis caused by irritants of a mechanical nature. It is more common in occurrence and more progressive in its manifestations because of the continuous formation of the deposits of dental calculus. Dental calculus is formed from the salivary secretions. Dental calculus of the exposed type is a great factor in causing an unhygienic condition of the mouth and marginal pyorrhea. The subgingival type of dental calculus may be found in the gingival crevices on the mesial and distal surfaces of the teeth. This type of calculus has been generally described as serumal calculus, microscopically it is similar to calculus of the exposed type and accumulating in a crevice whereby its color varies from green to black where pigments are attributed to the blood cells escaping through the broken epithelium.

### Gingivitis Due to Infection

Vincent's infection is an acute inflammatory disease of infection of the gingival borders, the crests of the interdental papillae and the tonsils. It often occurs in mouths where the hygienic condition is poor but may occur in mouths that are clinically in a good state of hygiene. Chronic inflammation of the gingivae and infection in pyorrhea pockets often develop into acute infections. This condition Coolidge considers as a mixed infection.

### Gingivitis Associated with Systemic Disorders

The inter-relation between the health of the oral tissues and general systemic condition is so important that the dentist should not consider the treatment of the oral tissues as an independent subject. The recognition of symptoms of systemic disturbances manifested in the mouth is a very important and necessary part of the practice of periodontia. While some systemic diseases have oral manifestations that require local treatment by the dentist, there are other systemic conditions in which certain oral symptoms should be viewed with suspicion and extensive dental services withheld until a physician has completed the diagnosis. The extraction of the teeth may be more advisable in an emergency for the patient with broken down natural dentition which can be restored only by extensive treatment, but who is in poor physical condition or is a terminal case.

The uncontrolled or poorly controlled diabetic has the following oral symptoms: a sudden appearance of acute gingival swellings resembling abscess formation which appear as reddened areas later becoming broad-based eruptions from which an exudate is discharged with considerable loss of tissue. Gingivitis associated with blood disturbances are many times seen in patients suffering from anemia. The oral manifestations of pernicious anemia are always important factors in the diagnosis. The gingiva is usually of a pale blue or waxy color and has a relaxed, characterless appearance.

Leukemia is also found with oral symptoms, often diagnosed as leukemic gingivitis. The gingival tissues become enlarged, soft, and hypertrophic and often cover the exposed surface of the crowns of the teeth.

Some of the vitamin deficiency and dietary conditions that are reflected in the oral cavity, such as scurvy, pellagra, beri-beri and sprue are not often seen in the long term patient. The diets planned and supervised by the Dietetic Service aid greatly in keeping these conditions to a minimum.

### Pyorrhea

Another phase in the treatment of long term patients both young and geriatric, is the condition indicated by the term "pyorrhea." Pyorrhea is a condition where there is a flow of pus from the gingival crevices. There is no definite line of demarcation established between the depth of the normal and the diseased gingival crevices. The flow of pus from the gingival crevices which is the distinguishing characteristic of periodontal disease may occur as an expression of a purely local and superficial inflammatory condition, or may be from a deeper seated, chronic inflammatory condition associated with the degeneration of the periodontal tissues.

Marginal pyorrhea is the simplest form of marginal periodontitis which is usually associated with an unhygienic condition of the mouth. It begins as gingivitis, marginal or superficial inflammation, followed by suppuration. This condition belongs to the classification of Gottlieb which he termed "Schmutz pyorrhea." Paradental pyorrhea is a condition of the periodontal tissue in which pus is continuously formed in the gingival crevices and, as stated by Gottlieb, "persists in spite of existing or re-established hygienic conditions." The term "pyorrhea" is often too broadly used. It should not be applied to all stages of the disease. The definition of pyorrhea indicates bone destruction, as well as inflammation in the soft periodontal tissues.

What has been presented so far dealt mainly with the young long term patient. The problems in handling the old or geriatric patient presents factors faced in Gerodontia. Gerodontia may be defined as "that department of dentistry which treats all problems peculiar to the oral cavity in old age and the aging including the clinical problems of seniscence and senility.

### Dental Problems in the Aged (Massler)

*Tissue Friability.* Due to thin atrophic epithelial covering with diminished resistance of the underlying connective tissue. Evidenced as a tendency to painful traumatic ulcers and recurrent apthae after mild stress or minor irritations. Angular cheilosis probably related to riboflavin deficiency.

*Abnormal Taste Sensations and Stomadynia.* Burning sensations in the tongue, persistent sour or metallic taste and atrophic glossitis. Probably related to concurrent vitamin B complex and estrogen deficiencies. Often relieved by high vitamin B intake plus increased intake of meat proteins.

*Postmenopausal Osteoporosis.* Evidenced early in vertebrae. May be related to excessive alveolar ridge resorption.

*Excessive Bone Resorption.* Excessive or rapid vertical or horizontal alveolar bone resorption leading to periodontal diseases. Rapid and excessive ridge resorption under full dentures. Relation to negative calcium balance is suggested.

*Delayed Wound Healing.* Post-extraction wound healing often delayed with tendency to intercurrent infections. Often prevented by vitamin C therapy (200 mg. per day before and after surgery). Also related to protein deficiency states. Careful preparations for surgery is mandatory in the aged.

*Fungal Infections.* Overgrowth of Candida albicans common, especially under full dentures and on tongue.

*Vague Fears and Pains.* Causalgic pain in edentulous area from which a painful tooth was extracted years ago, is common and characteristic of the aged. Often related to emotional disturbances. Characteristic of the insecure at any age level. Exaggerated in the aged.

Rx: Patience, understanding and empathy.

### Oral Manifestations of Aging (Massler)

*Loss of Teeth.* Due primarily to degeneration of periodontal structures.

*Attrition.* Rate is directly influenced by physical character of the diet.

*Oral Mucosa.* Loss of elasticity with dryness and atrophy. Tendency to hyperkeratosis.

*Gingivae.* Loss of stippling. Satiny or edematous appearance. Keratinized layer thin or absent. Tissue friable and easily injured.

*Saliva.* Diminished function of salivary glands with relative or absolute xerostomia due to atrophy of cells lining the intermediate ducts. Xerostomia results in abnormal taste sensations and stomadynia.

*Tongue:* Atrophic glossitis, probably due to concurrent B complex vitamin deficiency states.

*Lips:* Angular cheilosis is very common and probably related to concurrent vitamin B deficiency and closed bite. Cheilitis and purse-string mouth due to dehydration.

There are many disorders commonly associated with persons past middle age which may adversely affect oral health. Some of these diseases are arteriosclerosis, hypertension, diabetes mellitus, glandular disorders including obesity, gout, Parkinson's disease, arthritis and neoplasms. The importance of gerodontia should not be underestimated. In a study of 1,000 cases chosen at random, of persons between the ages of 40 and 60 years old, periodontal diseases or premature loss of teeth or both were present in 98% of the cases examined and practically every patient was mentally distressed about his condition. *The great majority of our population does not as yet receive adequate dental care.* Because of this, the mouth of the average person is damaged at an early age with progressive loss of teeth, shifting of teeth in the physiognomy. Temporomandibular joint disturbances are more common in older persons. This is usually due to traumatic occlusion or premature wear of teeth with accompanying loss of vertical dimensions. Diminution of facial measurements and atrophic changes of the jaws are due to loss of musculatory function and loss of teeth. Dentures worn in time would prevent senile changes.

We have changes in the natural teeth in old age.

(1) Change in form of the crown by abrasion.
(2) Change in form of the pulp chamber by the deposition of secondary dentin.
(3) Changes in the form of roots by the addition of cementum.
(4) Retraction of the gingivae.

Effect of abrasion upon the teeth and their function depends primarily upon the degree to which the abrasion has progressed and may be classified as direct and indirect.

A. Direct Effects
   1. Sensitiveness to thermal and chemical changes.
   2. Possibility of an exposure of the pulp.

B. Indirect Effects
   1. Irritation of the tongue and cheek.
   2. Caries resulting from loss of approximal contact.

The loss or complete absence of teeth gives rise to many abnormal masticatory habits and prevents oldsters from following a normal, wholesome nutrition program. Furthermore, the program of dental examinations at twice yearly intervals is an alien concept to many of our older citizens. In a survey, 70% of patients over 65 years of age have been in need of very considerable dental repair. The absence of teeth should be no deterrent to satisfactory eating. A mechanical diet or foods of high concentration are available and the tongue itself is also a strong organ to aid in mastication.

### Nutritional Problems

The nutrition of old age is a problem worthy of the utmost efforts toward its solution. That digestion and subsequently nutrition begins in the oral cavity is readily conceded by all concerned in the healing arts professions. Yet as stated by O'Rourke and Miner,

"the frequent and often casual disregard for masticatory function in elderly people appears to have its origin in two points of view. First, there is the tendency to consider that physiological and chronological age are identical and that at certain ages a loss of teeth is inevitable. Second, there is the quite common assumption that elderly people require but little food and that the necessary diet can be adequately cared for by artificial dentures or without teeth of any kind. There is no evidence to show that elderly people require less in the way of proper nutrition than was necessary in their period of maturity although older persons leading a comparatively inactive life require less caloric intake than in former years.

Full denture construction is a phase of dentistry that is prescribed to a very large number of our older patients. In full denture prosthesis, the proper mental adjustment of the patient is as important as the proper functioning of the teeth. Special care must be used to give maximum efficiency and esthetics. The restoration of proper tooth and face forms are important with allowances for efficient mastication and proper retention. Periodic examination with rebasing of dentures and alterations of tooth form as required, will give maximum aid to the patient. Establishment of the correct vertical height and retention of the free-way space is of prime importance to avoid temporomandibular disturbances, fissuring at the angles of the lips and faulty speech.

To accomplish this, the dentist is confronted with many barriers. Patients often wear dentures beyond their state of usefulness and refuse to have new dentures made. Patients who had an insufficient number of natural teeth over a long period of time before becoming edentulous are faced with the problem of changing their old poor habits in mastication when given full dentures. In elderly persons there is a lost interest in eating and they want to leave well enough alone. They may eat food high in carbohydrates and low in protein (probably because these foods are easy to obtain, prepare and chew) despite the fact that protein needs are not appreciably reduced with age. Then the patient with a psychosomatic problem is presented; here a thorough diagnosis of the patient must be made before a plan of treatment is instituted. A hopeless situation is encountered when the elderly patient lacks the will to cooperate.

In conclusion, a statement by J. H. Shiedon, President of the International Gerontological Society, points out that it will be difficult in 20 years to cope with a 50% increase in old people whose average duration of incapacity from the infirmities of old age is the same as now; but it would be totally impossible to deal with a situation in which this increase in total numbers would be accompanied by an increased duration of incapacity.

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# A Technic for Obstetric Anesthesia in a Small Military Hospital

*By*

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THE method described in this report should be as useful in civilian practice as it has been in the military service where it solved the problem of providing a standard procedure for obstetric anesthesia.

While on a tour of active duty as medical officer in a 125-bed military hospital, providing for obstetric anesthesia was difficult because the turnover of medical personnel was rapid and frequently there were medical officers who had only recently completed their internships; the training or even the schooling of the officers often varied considerably. Most deliveries were managed by general-duty medical officers, although one or more qualified physicians were available for consultation and management of complicated cases.

After much deliberation, a technic for obstetric anesthesia was adopted which proved to be easily mastered and quite feasible for routine use. The technic consisted of nitrous oxide-oxygen inhalation supplemented by pudendal nerve block with chloroprocaine (Nesacaine).‡ In practice the technic proved to be very satisfactory for the 54 consecutive, uncomplicated vaginal deliveries of our study.

## METHODS

All patients in this series had visited our prenatal clinic and none was known to suffer from any drug allergy or idiosyncrasy. No patient had taken food less than 4 hours before delivery. The following routine procedure was used: where time permitted and it was deemed advisable, the patient was given premedication in the form of one or a combination of several commonly employed analgesic, sedative, or pre-anesthetic drugs; when less than an hour remained before delivery, the woman was taken to the labor room and prepared for delivery without any medication.

The patient was told that a nerve block would be carried out before she was given a general anesthetic. After preparation of the field, a pudendal nerve block was made either trans-vaginally, or, if the fetal head had descended too far, through a perineal skin wheal.

Chloroprocaine (Nesacaine—2%) was used to obtain pudendal nerve block in 50 patients. It was found to be rapid-acting and potent, devoid of undesirable side effects, and gave prolonged, effective anesthesia. Because of the intensity of its action, the required amounts of Nesacaine were 4-6 cc. rather than the usual 30 cc. of other local agents (e.g. procaine).

On completion of the nerve block, nitrous oxide-oxygen anesthesia was given. The disadvantages of inducing general anesthesia *first* are these: (1) the patient usually bore down with uterine contractions—especially when there was intravaginal manipulation; (2) higher concentrations of nitrous oxide were required; (3) it was difficult to determine the effectiveness of the nerve block; and (4) untoward drug reactions were more difficult to recognize when the patient was under general anesthesia.

The advantage of administering the nerve block first is that higher concentrations of oxygen may be used with nitrous oxide, as an added measure of prophylaxis against maternal and fetal hypoxia.

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‡ The Nesacaine used in this study was supplied by Maltbie Laboratories Division of Wallace & Tiernan Inc., Belleville, N.J.

Ratios of 3:1 (L./min.) and 2:1 of nitrous oxide-oxygen usually were found to be adequate. This was attributed to the effects of the predelivery medications and the pudendal nerve block. Shortly before delivery, whenever possible, 100% oxygen was administered. There was no instance of fetal depression in this series, nor was hypoxia noted.

Episiotomy was performed when required, and delivery was effected either spontaneously or by forceps. After the second stage of labor, inhalation anesthesia was discontinued and the episiotomy was easily repaired, utilizing the prolonged anesthetic effect of the pudendal block.

## Results

With chloroprocaine hydrochloride (Nesacaine), fourteen primipara and forty multipara were delivered by five medical officers, only one of whom had formal training in obstetrics.

Fourteen multipara and two primipara received only pudendal nerve block; no other anesthetic was required. Four multiparous patients did not receive any anesthetic because of the imminence of delivery.

Episiotomy was performed in all cases except eight multipara. In these patients there was one second-degree laceration and three small mucous membrane tears.

Outlet forceps were used to deliver eight primipara and twelve multipara. In all cases requiring the use of forceps, inhalation anesthesia was used in addition to nerve block.

## Summary and Conclusion

The use of pudendal nerve block prior to and as a supplement to nitrous oxide-oxygen (3:1 or 2:1) inhalation anesthesia is a simple procedure which provides a wider margin of anesthetic safety during delivery.

Two percent chloroprocaine hydrochloride (Nesacaine) was utilized to produce pudendal nerve block in 50 vaginal deliveries. The regional anesthesia was completely satisfactory, without any failure or reaction, yet the doses of chloroprocaine were far smaller than those required with other common local anesthetics.

# Some Aspects of the Pathology of Wounding by the Mk. II Grenade and by Single Fragments, As Observed in Goats

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## Introduction

In 1954 the Biophysics Division had occasion to carry out field experiments dealing with the effectiveness of the Mk. II grenade against animal target (goats), such studies being necessary to obtain data bearing upon the treatment of battlefield wounds, in order to effect a maximum saving of human lives. This report is concerned with the pathological features of wounding by that weapon, with special reference to the character of the wounds produced and the causes of death in animals killed by the grenade bursts. For comparison, there are also presented the findings on animals subjected to wounding under carefully controlled laboratory conditions by single missiles of sizes corresponding to those of the grenade fragments.

## Materials and Methods

In each of six field experiments, conducted on different days, a single Mk. II grenade (the well-known standard "pineapple" grenade in use since World War I) was suspended a few feet from the ground and was detonated electrically. Seven goats, located from 5 to 60 feet from the grenade, were exposed broadside to each bursting grenade. Altogether, 34 of the goats were hit by one or more grenade fragments, some of the more distant ones escaping injury.

Grenade fragments recovered from the animals used in these experiments ranged in weight from less than 0.5 grains (.032 gm.) to 17 grains (1.102 gm.). Our comparison series, accordingly, is made up of goats wounded by single shots with missiles of various sorts ranging in weight from about 1 grain to 17 grains. Of 320 cases of this kind coming to autopsy during calendar years 1952 through 1955, 260 were found to be suitable for use in this study. (The other 60 cases had to be eliminated for various reasons, such as sacrifice of the animal earlier than the standard 48 hours, inadequate autopsy records, etc.)

Most of the animals, including all of those used in the grenade experiments, were grade goats procured in the eastern part of the United States. Some of those used more recently were white Angoras from Texas. The animals ranged in weight overall from 20 kg. to 72 kg.; those used in the grenade experiments were somewhat more uniform, varying from 31 kg. to 57 kg. A representative animal may be thought of as weighing about 40 kg. The animals appeared to be in good health on casual inspection. At autopsy, disease processes not attributable to trauma were often found, such as pneumonia and various parasitic infections. Such findings were observed both in animals succumbing to wounds and in survivors, with about equal frequency, and cannot be considered to have had any important effect on the outcome of the experiments, at least with respect to the death or survival of the animals after wounding.

The animals were observed after wounding, but were not treated in any way. The time of death was recorded in those dying within 48 hours after wounding. Animals surviving for 48 hours were sacrificed, at about that time, usually by electrocution. Autopsies were performed on all the animals, as a rule quite soon after death. Microscopic sections of the autopsy material have been examined, but, since the microscopic findings have little direct bearing

upon the questions presently under discussion, extensive reference to them will be avoided in this report.

All free blood in the serous cavities, retroperitoneal space, or mediastinal spaces, or in the form of discrete hematomata elsewhere was carefully evacuated and measured in a graduate or weighed. Mere estimates of volumes of extravascular blood were avoided; no cases in which only estimates of amounts of hemorrhage were recorded are included in this report. Such estimates, even when made by experienced personnel, are felt to be very unreliable. This applies even more strongly to estimates of blood lost externally. Since, however, it was impracticable to measure the volume of blood lost externally, the estimates of observers on the spot were given some credence, especially when autopsy revealed an anatomical basis for them. The amount of interstitial bleeding into wounded tissues, which, as judged from both gross and microscopic observations, may sometimes be considerable, was not measured, and such blood loss is not included in the numerical values presented below. No correction has been made for possible passive bleeding from wounded vessels after the death of the animal. The figures for blood loss are to be looked upon as lower bounds, since in no case could all of the extravascular blood be recovered and measured.

The volumes of extravascular blood recovered will be presented in terms of cubic centimeters of blood per 100 grams body weight (cc./100 gm. body weight). This "normalization" is carried out in order to permit comparisons between goats of varying body weights. The figure can be converted into cubic centimeters, for a representative 40 kg. goat, by multiplying by 400. A more pertinent figure would be the per cent of original blood volume lost from the vascular system. This cannot be given, since intravascular blood volumes were not determined in these animals before (or after) experimentation. The blood volume of a normal goat is about 5 cc. to 9 cc. per 100 gm. body weight. Values obtained for individual goats vary widely, and appear to depend rather strongly upon the method used for the determination. A rough tentative estimate may be taken to be 7 cc. per 100 gm. body weight.

All of the experimental work, both with grenade bursts and single shots, was performed in the Biophysics Division by Dr. A. J. Dziemian and his associates.

## Results with Mk. II Grenade

The pertinent data on the 34 goats coming to autopsy after exposure to a grenade burst are summarized in Tables Ia, Ib, IIa, IIb and III. Tables Ia and Ib give information on the same group of goats, arranged in the same order, and are to be examined together, as are Tables IIa and IIb. In the "Number of hits" column there are recorded the total number of skin wounds found on the side of the animal presented to the grenade, which should correspond very closely to the number of individual grenade fragments striking the surface of the animal. The "Survival time" is measured from the instant of burst of the grenade to the time of cessation of observable vital activity (heart beat, respiration, corneal reflex). In Table Ia it is accurate to the nearest minute; in Table IIa to the nearest hour. The method used in obtaining the values for measured blood loss has already been described.

A glance at the survival times will make it clear why the cases have been broken up into three groups. It is apparent that most of the animals killed by the grenade died within one hour, while only a few of those surviving for one hour died within 48 hours (at which time all survivors were sacrificed). The cases have, accordingly, been divided into those of:

*prompt death* (death within one hour),
*delayed death* (survival for one hour but death within 48 hours), and
*48-hour survival.*

The striking tendency for the vast majority of wounded animals either to die promptly or to survive for 48 hours (or "indefinitely")

TABLE Ia. MK. II GRENADE—PROMPT DEATH—MEASURED BLOOD LOSS

| Autopsy No. | Number of hits | Survival Time (minutes) | Free blood (cc./100 gm. of body weight) recovered from: | | | | Total measured blood loss* (cc./100 gm. body wt.) |
|---|---|---|---|---|---|---|---|
| | | | Pericardial sac | Pleural cavities & Medi-astinum | Peritoneal cav. & Retroperit. | Other sites | |
| G717 | 29 | 3 | .07 | 1.9 | 0.2 | | 2.2 |
| G718 | 24 | 3 | | 0.2 | 1.3 | | 1.5 |
| G719 | 8 | 3 | .29 | 3.1 | 0.4 | | 3.8 |
| G721 | 49 | 4 | | 1.5 | 1.4 | | 2.9 |
| G722 | 85 | 4 | | 1.8 | 0.7 | (considerable external bleeding) | 2.5+ |
| G723 | 3 | 37 | | | 0.4 | hematoma, neck 0.2 (much ext. bleeding) | 0.6+ |
| G729 | 1 | 4 | | 4.1 | | | 4.1 |
| G730 | 70 | 1 | .02 | 1.7 | 0.4 | | 2.1 |
| G731 | 28 | 2 | .21 | 1.7 | 0.5 | | 2.4 |
| G732 | 4 | 30 | | | 3.0 | | 3.0 |
| G733 | 40 | 2 | | | 3.7 | | 3.7 |
| G734 | 38 | 9 | | 0.5 | 3.6 | | 4.1 |
| G740 | 35 | 3 | | 1.7 | 0.4 | | 2.1 |
| G741 | 55 | 34 | | 2.6 | | | 2.6 |
| G742 | 46 | 1 | | 1.3 | 4.4 | | 5.7 |

* + indicates significant additional unmeasured blood loss in this and other tables.

will be noted also in the single-shot cases to be discussed later, and has been observed in this laboratory in many other goats wounded by missiles larger than those covered in this report.

It is seen that, of the 34 grenade cases, there was:

prompt death in 15,
delayed death in 5,
48-hour survival in 14.

The tendency for death from wounding by grenade fragments to occur quite promptly, if it occurs at all, becomes even more evident if we note that, of the 15 prompt deaths, 11 actually occurred within 5 minutes. Thus over half of all fatally wounded goats died within 5 minutes of wounding, and three-quarters within one hour.

*Prompt death from grenade wounds.* The cause of death in each case of prompt death appears to be adequately established by the

TABLE Ib. MK. II GRENADE—PROMPT DEATH—WOUNDS

| Autopsy No. | Vascular Wounds* | Other wounds of internal organs |
|---|---|---|
| G717 | heart, thoracic aorta, liver | lung |
| G718 | abdominal aorta & vena cava, liver | lung, kidney, small intestine, colon |
| G719 | heart | colon |
| G721 | abdominal vena cava | lung, kidney, rumen, small intestine, colon |
| G722 | liver | lung, kidney, rumen, reticulum, abomasum, colon |
| G723 | carotid artery, liver | lung, rumen, omasum |
| G729 | thoracic aorta | lung |
| G730 | thoracic aorta, abdominal vena cava, liver | lung, kidney, rumen, colon |
| G731 | heart, thoracic aorta, liver | lung, spleen, reticulum |
| G732 | external iliac artery | none |
| G733 | abdominal aorta, renal artery, liver | lung, pancreas, kidney, rumen, abomasum |
| G734 | liver | gall bladder, spleen, pancreas, kidney, rumen, omasum, abomasum, small intestine |
| G740 | heart, thoracic vena cava, liver | lung, kidney, colon |
| G741 | large branch of pulmonary artery, liver | lung, adrenal, rumen, reticulum, colon |
| G742 | abdominal aorta & vena cava, renal artery, liver | cervical spinal cord, pancreas, kidney, esophagus, rumen, small intestine, colon |

* Vascular wounds include wounds of heart, arteries, veins or liver in this and other tables.

autopsy findings. In every case there was rapid massive hemorrhage. On the basis of these and many other observations, we feel that death can result in the goat from rapid hemorrhage of at least:

.25 cc./100 gm. body weight into the pericardial sac, or

1.5 cc./100 gm. body weight into the pleural cavities or peritoneal cavity.

In most cases of prompt death, considerably greater hemorrhage than that just mentioned is found to have occurred. In the grenade cases, because of the frequency of multiple wounds, free blood was usually present in more than one of the serous cavities. No brain wounds occurred in the animals subjected to wounding by the Mk. II grenade.

As shown in Table Ib, the source of the hemorrhage was demonstrated in every case. It will be observed that liver wounds are included under "vascular wounds", a usage that will be followed throughout this paper. It has been our experience that, in the goat, extensive bleeding can occur from a wound of the liver in the absence of demonstrable wounding of grossly delineable blood vessels. This is not the case with other organs (such as lungs, spleen or kidneys), at least when wounded by missiles of the sizes here under consideration. Actual wounds of large blood vessels were demonstrated in all but two cases.

Several cases are of special interest. G717,

TABLE IIa. MK. II GRENADE—DELAYED DEATH—MEASURED BLOOD LOSS

| Autopsy No. | Number of hits | Survival Time (hours) | Free blood (cc./100 gm. of body weight) recovered from: | | | | Total measured blood loss (cc./100 gm. body wt.) |
|---|---|---|---|---|---|---|---|
| | | | Pericardial sac | Pleural cavities & Mediastinum | Peritoneal cav. & Retroperit. | Other sites | |
| G720 | 9 | 4 | | | 0.6 | (much external bleeding) | 0.6+ |
| G735 | 3 | 29 | | 0.2 | 0.5 | | 0.7 |
| G736 | 2 | 25 | | | <0.1 | <0.1 | 0.1 |
| G743 | 5 | 27 | | | | hematoma, chest wall—0.3 (much ext. bleeding) | 0.3+ |
| G744 | 36 | 4 | few cc. | 0.4 | 0.2 | | 0.6 |

G718, G730, G731 and G740 illustrate that the amount of blood lost from the vascular system cannot be predicted too accurately from the character of the vascular wounds. In all of these cases the heart or one or more large vessels was wounded, so that the animal was, it would appear, free to bleed to an indefinite extent, yet died after losing only a relatively moderate amount of blood. On the other hand, G732, with no significant wounds except that of the external iliac artery, lost considerably more blood before expiring. In cases such as the five first mentioned, all of which died in a very few minutes, the decisive factor was probably the suddenly imposed hemodynamic imbalance resulting from very rapid, even if not extremely massive, hemorrhage. In G732, the bleeding was presumably slower, but eventually greater, with slowly developing hemodynamic changes, to which the animal could adjust himself up to a point, accompanied by an inexorably increasing loss of circulating hemoglobin.

G729 is an uncomplicated case of massive bilateral hemothorax resulting from a lacerating wound of the aorta. In such cases, of course, there is superposed upon the rapid blood loss mechanical interference with respiration. The only instance of cardiac tamponade (according to the criterion given above) in this group of cases is G719. Here,

TABLE IIb. MK. II GRENADE—DELAYED DEATH—WOUNDS

| Autopsy No. | Vascular Wounds | Other wounds of internal organs; remarks |
|---|---|---|
| G720 | carotid artery | trachea, small intestine; blood aspiration into lungs |
| G735 | liver | lung, reticulum |
| G736 | none | rumen, small intestine, colon; extensive acute peritonitis |
| G743 | none | none |
| G744 | heart (wall not perforated), liver | lung, pancreas, small intestine, colon; fresh infarcts of kidney |

TABLE III. MK II GRENADE—48-HOUR SURVIVAL

| Autopsy No. | Number of hits | Total measured blood loss (cc./100 gm. body wt.) | Vascular and other wounds |
|---|---|---|---|
| G724 | 1 | 0 | none |
| G725 | 1 | 0 | none |
| G726 | 2 | 0 | none |
| G727 | 1 | 0 | none |
| G728 | 4 | 0 | none |
| G737 | 2 | 0 | none |
| G738 | 7 | 0.4 | rumen, colon |
| G739 | 3 | 0 | none |
| G745 | 3 | 0 | none |
| G746 | 2 | 0 | kidney, small intestine |
| G747 | 6 | 0.5 | liver |
| G748 | 1 | 0 | none |
| G749 | 1 | 0 | none |
| G750 | 1 | + (considerable external bleeding) | deep volar metacarpal artery |

as is often the case, there was also extensive bleeding through the pericardial wounds into the pleural cavities. In G723, the wound of the carotid artery and the observation of extensive external bleeding in the field indicate that death again resulted from relatively gradual but massive hemorrhage. Several of the cases showed hemothorax associated with wounds in the dome of the liver, much of the blood from the lacerated organ being directed into the chest rather than into the abdomen because of the anatomical arrangements in this region.

It is of interest to observe that there is a very wide variation in the number of hits on the animals dying promptly. One (G729) suffered only one hit, but sustained a wound of the aorta and died in 4 minutes. Another (G741) was hit by 55 fragments and had wounds of many internal organs. Death, however, was caused by bleeding from a wound of a branch of the pulmonary artery and did not occur until 34 minutes after wounding. It is apparent that the important factor in cases of prompt death in these animals was not the number of hits or the number of organs wounded, but rather the production of rapid massive hemorrhage,—and this always resulted from wounds of the heart, large blood vessels or liver. A goat struck by a large number of fragments is, to be sure, in more jeopardy of prompt death than one struck by only a few, but simply because, on the basis of anatomy and geometry, the larger the number of hits the greater the chance of a serious vascular wound.

*Delayed death from grenade wounds.* Only 5 of the 34 wounded goats died after surviving for one hour. These cases are summar-

ized in Tables IIa and IIb. The earliest delayed deaths did not occur before 4 hours. As compared with the prompt deaths, these animals showed less internal hemorrhage, and fewer and less severe vascular wounds.

The causes of death are not so apparent as in the cases of prompt death. G720 showed much aspiration of blood into the bronchial tree through the tracheal wound, the trachea and bronchi being completely filled with blood clot by the time of autopsy. Death was clearly from asphyxia in this case. The goat would probably have survived indefinitely if the airways had not been occluded. In G736 there was a considerably more intense and more generalized fibrinous peritonitis than in many other goats with gastrointestinal wounds, but equally severe peritonitis has been observed in goats surviving 48 hours and not obviously moribund or in any apparent distress at that time. In the other 3 cases, it is felt that the anatomical findings did not account for the death of the animal. Several of these goats showed acute pneumonia and parasitic lung disease (both obviously present before wounding), but such lesions have been found rather frequently in surviving goats and cannot properly be considered causes of death, although they may well have contributed to the fatal outcome.

One is tempted, of course, to attribute the deaths of these animals to shock. In the absence of extensive clinical and physiological study of the individual cases, and in view of the lack of any unique anatomical changes either gross or microscopic, such a diagnosis does not seem justifiable, unless it is understood to indicate nothing more than delayed death for unknown reasons.

*48-hour survival with grenade wounds.* These 14 cases are briefly summarized in Table III. Many suffered no wounds of internal organs or vascular structures. In the few that did, the wounds were relatively minor and did not result in serious hemorrhage. The goat usually tolerates peritoneal contamination from ruminal and intestinal contents quite well, so that even the cases with wounds of the gastrointestinal tract were in good condition when sacrificed. It will be noted that one 48-hour survivor was hit by 7 fragments, another by 6.

### Results With Single Shots

These 260 animals all were wounded by single missiles of sizes in the range of the fragments emitted by the Mk. II grenade (i.e., weights up to 17 grains). All of the single shots were made under controlled laboratory conditions. They were aimed at specific organs or body regions, and almost always struck with considerable accuracy. These shots thus did not hit, and were not designed to hit, the animals in the more or less random fashion to be expected in the field. The relative anatomical distribution of the single shots is thus of no significance in the present connection. The results as regards prompt death, delayed death and 48-hour survival are, however, of considerable interest, especially when compared with the results of the field experiments with the grenade bursts.

We shall see the same marked tendency for the occurrence of either prompt death or survival, with only a relatively few delayed deaths, that we observed in the grenade cases. Again, prompt death will be found to result principally from rapid massive hemorrhage, usually associated with demonstrable vascular wounds. Cases of delayed death will still, by and large, be unexplained on an anatomical basis. In these 260 cases there was:

prompt death in 90 cases,
delayed death in 26 cases,
48-hour survival in 144 cases.

A more detailed analysis of the survival times in the cases of prompt death is given in Table IV. It will be observed that most of the prompt deaths occurred quite early, about 70% of them, for example, within 10 minutes.

Delayed deaths occurred in 10% of the 260 animals wounded by single shots and, more pertinently, accounted for less than one-fourth of the total deaths. The earliest

TABLE IV. SURVIVAL TIMES IN CASES OF PROMPT DEATH—SINGLE SHOTS

| Survival times (minutes)* | Number of cases |
|---|---|
| 0– 5 | 38 |
| 5–10 | 26 |
| 10–15 | 9 |
| 15–20 | 4 |
| 20–25 | 6 |
| 25–30 | 2 |
| 30–60 | 5 |
| Total | 90 |

* In all tables, number intervals exclude the lower and include the upper endpoint. For example, a survival time of 10 minutes is listed under 5–10, not under 10–15.

delayed death was at about 2 hours, but only 4 of the 26 died within 10 hours.

*Pathological findings and cause of death in single-shot cases.* In order to display the pertinent data we may conveniently divide these cases into groups according to the general anatomical region wounded. There is only one instance in which death resulted from external hemorrhage. That animal survived 12 minutes after sustaining wounds of one jugular vein and both common carotid arteries. (No other cases of severe external hemorrhage are available, since an effort was made to avoid rather than produce this type of wounding in the single-shot experiments.)

The other cases all fall within one or other of the following categories:

Wounds produced by missiles passing into or through the cranial cavity or cervical portion of the spinal canal (34 cases).

Wounds producing bleeding into the pericardial cavity (29 cases).

Wounds producing bleeding into the pleural cavities or mediastinum (47 cases).

Wounds producing bleeding into the peritoneal cavity or retroperitoneal space (68 cases).

No serious wounds or significant hemorrhage (81 cases). The findings will be presented largely in tabular form.

*Brain and cervical cord.* The cases in which a missile penetrated into the cranial cavity or cervical spinal canal are collected in Table V. The relative frequency of prompt death is particularly high in these cases. (Animals suffering wounds of the head and spine that did not penetrate into the cavities named all survived in good condition until sacrifice after 48 hours.) Some prompt deaths occurred in the absence of actual wounds of the brain or cord. In these instances there was always extensive subarachnoid hemorrhage, especially around the brain stem or cervical cord or both. Similar marked subarachnoid hemorrhage was present in the cases of prompt death with brain or cord wounds. On the other hand, the animals sustaining brain or cord wounds and surviving beyond one hour showed considerably less marked subarachnoid hemorrhage. The decisive feature as regards prompt death is thus the occurrence of extensive subarachnoid hemorrhage, rather than direct damage to the brain or cord. The immediate cause of death is undoubtedly the rapidly developing increase in intracranial pressure resulting from the hemorrhage. Direct trauma

TABLE V. CRANIAL CAVITY OR CERVICAL SPINAL CANAL PENETRATED BY MISSILE—SINGLE SHOTS

| | Number of cases of: | | | Total |
|---|---|---|---|---|
| | prompt death | delayed death | 48-hour survival | |
| Brain hit by missile | 18 | 3 | 3 | 24 |
| Brain not hit by missile | 4 | 0 | 0 | 4 |
| Cervical cord hit by missile | 3 | 0 | 1 | 4 |
| Cervical cord not hit by missile | 2 | 0 | 0 | 2 |
| Total | 27 | 3 | 4 | 34 |

TABLE VI. BLEEDING INTO PERICARDIAL CAVITY—SINGLE SHOTS

| Blood in pericardial sac (cc./100 gm. body wt.) | Number of cases of: | | | Total |
|---|---|---|---|---|
| | prompt death | delayed death | 48-hour survival | |
| 0–.25 | 0 | 0 | 2 | 2 |
| .25–.35 | 7 | 0 | 3 | 10 |
| .35–.45 | 7 | 1 | 1 | 9 |
| .45–.55 | 4 | 0 | 0 | 4 |
| .55– | 3 | 1 | 0 | 4 |
| Total | 21 | 2 | 6 | 29 |

by the missile to a vital part of the brain, such as the respiratory center, could certainly cause death, even in the absence of significant hemorrhage, but no deaths attributable to such an event were observed. Indeed, we have occasionally been surprised at the location and extent of damage to the central nervous system in animals surviving even as long as 48 hours.

Goats having brain wounds but not dying promptly were obviously seriously injured, usually remaining unconscious during the entire survival period or being, at best, prostrated. Only one such animal recovered sufficiently to stand up unsteadily for a short period. Animals with more than minimal direct wounding of the thoracic or lumbar cord showed the expected complete paralysis of the hind legs. Such goats were sacrificed as soon as it was apparent that the paralysis was irreversible, and account for a considerable proportion of the cases mentioned above that had to be excluded from the series here reported because of early sacrifice.

*Bleeding into pericardial cavity.* Table VI shows all cases in which the outstanding finding at autopsy was hemopericardium. Whenever an amount of blood greater than .25 cc./100 gm. body weight was present in the pericardial sac, the case was put into this group, regardless of other findings. Cases with small collections of blood in the pericardial cavity and large amounts in the pleural cavities were placed in the hemothorax group, below. All of the animals in the present group had wounds of the heart, except for three (each with prompt death) in which there were, instead, wounds of the intrapericardial portions of the aorta, brachiocephalic artery, vena cava or pulmonary artery. Wounds through the pericardial membrane were present in every case. However, not all cases with heart wounds are included here, since, in some of them, the lacerations of the pericardium were large enough to permit such free outflow of blood into the pleural cavities and mediastinum that only small amounts of blood remained in the pericardial sac.

In all of the cases of prompt death, the cause of death was considered to be cardiac tamponade. In a few instances this occurred in an almost uncomplicated form. One animal dying with a heart wound in 14 minutes, for example, showed 200 cc. of blood in the pericardial sac, the only other bleeding being 25 cc. into the right pleural cavity. Many of the animals, however, showed, in addition to the hemopericardium, degrees of hemothorax that in themselves could account for prompt death. An illustration is a case with a heart wound, dying in 8 minutes, with 125 cc. of blood in the pericardial sac, 800 cc. in the right pleural cavity and 550 cc. in the left pleural cavity. It will be noted that several of the goats with delayed death or surviving 48 hours showed considerable blood in the pericardial sac. In these cases, it is presumed that the bleeding through the wounds of the heart wall was slow enough to permit the pericardial membrane to stretch to such an extent as to delay or prevent fatal tamponade.

*Bleeding into pleural cavities.* The findings

TABLE VII. BLEEDING INTO PLEURAL CAVITIES—SINGLE SHOTS

| Blood in pleural cavities (cc./100 gm. body wt.) | Number of cases of: | | | Total |
|---|---|---|---|---|
| | prompt death | delayed death | 48-hour survival | |
| 0–1.0 | 2 | 2 | 18 | 22 |
| 1.0–2.0 | 3 | 0 | 2 | 5 |
| 2.0–3.0 | 8 | 1 | 1 | 10 |
| 3.0–4.0 | 8 | 0 | 1 | 9 |
| 4.0– | 1 | 0 | 0 | 1 |
| Total | 22 | 3 | 22 | 47 |
| Vascular wound demonstrated in | 17 | 2 | 10 | 29 |
| Only vascular wound that of liver in | 2 | 1 | 5 | 8 |

in these cases are summarized in Table VII. As would be anticipated, prompt death was associated with the larger hemorrhages. Vascular wounds were demonstrated at autopsy to account for the bleeding in about three out of four cases of prompt death. No doubt some vascular wounds were overlooked, in spite of the care taken to find them. Lung wounds produced by the small missiles under consideration, without lacerations of grossly delineable blood vessels, did not bleed too extensively, as a rule, but in a few cases no other source of bleeding could be found. The largest hemorrhage attributed to lung wounds alone was 2.6 cc./100 gm. body weight. Intrathoracic bleeding from liver wounds, in the absence of lacerations of blood vessels, was sometimes less marked than that from demonstrably wounded vessels, as indicated in the table. However, the two cases of prompt death from liver wounds alone had 4.5 cc./100 gm. and 2.3 cc./100 gm. body weight of blood in the pleural cavities, respectively, while two of the 48-hour survivors with only liver wounds had 3.4 cc./100 gm. and 2.3 cc./100 gm. body weight.

The two prompt deaths with relatively small amounts of intrathoracic hemorrhage deserve some attention. One of them, with only 0.3 cc./100 gm. body weight of blood in the pleural cavities, had a lung wound from which there was much aspiration of blood into the entire bronchial tree, so that death resulted from asphyxia. The other, with 0.7 cc./100 gm. body weight of blood in the pleural cavities, had a heart wound and .13 cc./100 gm. body weight of blood in the pericardial sac. This case resembled some of the grenade cases, in that death supervened after relatively little blood loss, even though an anatomical basis for much more extensive hemorrhage existed. Of the other 3 cases of prompt death with not more than 2.0 cc./100 gm. body weight intrathoracic hemorrhage, one, with only a lung wound, showed considerable blood aspiration into the bronchial tree without complete occlusion of all of the bronchial lumina. The other two each had additional bleeding into the peritoneal cavity (through holes in the diaphragm produced by the wounding missile), so that the total measured internal blood losses were 3.2 cc. and 2.3 cc./100 gm. body weight, respectively.

*Bleeding into peritoneal cavity or retroperitoneal space.* These cases form the basis for Table VIII. The instances of prompt death provide examples of death from practically uncomplicated rapid massive internal hemorrhage. One case, for example, suffered wounds of the left renal artery and vein and died in 2 minutes, with an accumulation of 4.3 cc./100 gm. body weight of blood in the peritoneal cavity and retroperitoneal space. Another animal, with wounds of the abdominal aorta and vena cava, died in 4 minutes and had hemoperitoneum amounting

to 4.3 cc./100 gm. body weight. When the vascular wounding was slightly less severe, the animals tended to survive a bit longer. For example, one goat having a wound of the right common iliac vein survived for 48 minutes and was found to have 3.3 cc./100 gm. body weight of blood in the peritoneal cavity.

In almost all of the cases in this group there were wounds (usually rather small) of the gastrointestinal tract, with varying amounts of leakage. Such wounds and the resulting contamination of the peritoneum were of little relative importance in the instances of prompt death. The peritonitis resulting was of widely varying extent and intensity, but no doubt contributed to the fatal outcome in many cases of delayed death. However, the same degree of peritonitis was sometimes noted in animals surviving 48 hours.

A fairly definite statement can be made regarding the likelihood of prompt death in the goat as related to the caliber of vessels lacerated in the abdominal region. All wounds of the abdominal aorta, abdominal vena cava or renal artery resulted in prompt death, as did wounds of the common iliac and internal iliac vessels. However, two animals, each with a wound of one of the larger branches of the internal iliac artery, both survived for 48 hours and were sacrified. These two cases showed total measured blood losses of only 0.9 cc. and 0.2 cc./100 gm. body weight. The only other 48-hour survivor having a grossly demonstrable wound of a blood vessel showed a wound of the right renal vein, with 1.1 cc./100 gm. body weight of blood retroperitoneally.

*No serious wounds or significant hemorrhage.* Most of these animals, wounded in various anatomical regions, had wounds involving only skin and soft tissues and, occasionally, bone. All but four, which will be discussed separately below, survived until sacrifice at 48 hours. In a few of the head wounds in which the skull was not perforated by the missile small areas of contusion were found on the surface of the brain. In a few other instances there were small superficial lacerations, and in others grossly evident small contusions, of the lumbar spinal cord, not associated with any obvious clinical changes. (Detailed neurological examinations were not performed.) In some other instances, in which the missile passed near the spinal cord without producing any gross lesion, a few scattered minute fresh hemorrhages could be found microsopically in the gray matter, especially of the ventral horns, in the part of the cord nearest the wound tract.

Delayed death occurred in two goats of this group. One animal, shot in the dorsal thoracic region, died in 10 hours. The missile passed through the base of the spine of the second thoracic vertebra, but did not enter the spinal canal. There was, however, some

TABLE VIII. BLEEDING INTO PERITONEAL CAVITY OR RETROPERITONEAL SPACE—SINGLE SHOTS

| Blood in peritoneal cavity or retroperitoneal space (cc./100 gm. body wt.) | Number of cases of: | | | Total |
|---|---|---|---|---|
| | prompt death | delayed death | 48-hour survival | |
| 0–1.0 | 0 | 10 | 29 | 39 |
| 1.0–2.0 | 2 | 4 | 6 | 12 |
| 2.0–3.0 | 6 | 1 | 0 | 7 |
| 3.0–4.0 | 7 | 1 | 0 | 8 |
| 4.0– | 2 | 0 | 0 | 2 |
| Total | 17 | 16 | 35 | 68 |
| Vascular wound demonstrated in | 15 | 2 | 13 | 30 |
| Only vascular wound that of liver in | 4 | 2 | 10 | 16 |

subdural hemorrhage around the spinal cord from the level of C-6 to that of T-4. The other animal died in 12 hours after sustaining a wound of both thighs, with a comminuted fracture of the right femur. There was considerably more damage to muscle and other soft tissues in this case than was usually encountered in wounds produced by missiles of the small size considered in this report. Several other goats with very similar traumatic lesions survived until sacrificed at 48 hours.

There were also two instances of prompt death that could not be explained even weakly on the basis of the autopsy findings. (These are the only two cases in our entire series of almost 1000 goats, wounded by missiles of all sizes, in which the mechanism of death is completely obscure.) The first animal was wounded in the chest and died in 7 minutes. The missile perforated the chest wall and, after passing through 5 cm of lung tissue, came to rest embedded in the lung. There was no bleeding into the pleural cavity and only a little hemorrhagic discoloration of the lung tissue around the wound tract. There was evidence of some blood aspiration into the bronchial tree, but this was not at all extensive. The animal had acute pneumonia and pleuritis (as did some other animals that survived much more severe wounding).

The other case of unexplained prompt death was a goat wounded in the head and dying in 11 minutes. The missile entered the lower forehead and passed completely through the head, emerging through the skin over the upper dorsal neck, after passing through the right wing of the atlas. The missile did not enter the cranial cavity or strike any of the bones forming its wall, but the tract lay just ventral to the base of the skull, slightly to the right of the midline. There was some hemorrhagic discoloration around the wound tract through the soft tissues, but not more than 20 cc. of free blood in the tract. A small amount of hemorrhage was present around the hypophysis, in the sella turcica. The brain was normal grossly. Microscopically, the only abnormalities were a few very small hemorrhages in the infundibular region. These findings are not considered adequate to account for the prompt death of the animal.

## Discussion

The results of the experiments just described are probably not very surprising, since it has been widely felt for some time that death of human battle casualties soon after wounding is usually the result of hemorrhage. Leaving out of consideration the two unexplained cases, we see that the fatal outcome in the remaining 103 cases of death within one hour after wounding is to be attributed to loss of blood from the vascular system. If we interpret the phrase in relation to the anatomical sites of the blood accumulations, we may say that all cases of prompt death showed rapid *massive hemorrhage*. In the subarachnoid space, which is quite small in the goat, even a small amount of free blood must be thought of as massive. In the pericardial sac, as little as 100 cc. of blood, in a goat of average size, constitutes a hemorrhage that can lead to fatal cardiac tamponade. Similarly, relatively small amounts of blood are enough to occlude the bronchial tree and produce asphyxia. In instances of bleeding into the pleural cavities with prompt death, the amounts of blood involved are massive by any criterion, death resulting from mechanical interference with respiration or exsanguination or a combination of the two. Prompt death from hemorrhage into the peritoneal cavity or retroperitoneal space is associated with the rapid loss from the vascular system of large amounts of blood, as is also the case in prompt death from external hemorrhage.

Instances of prompt death illustrating all of the possibilities just outlined were observed among the cases reported above. Except in head wounds, the actual wounds of the heart or blood vessels through which the bleeding occurred were demonstrated in most cases. In others, a wound of the liver bled profusely enough to produce massive hemor-

rhage. No other organs of the goat bled so profusely after wounding with the small missiles used.

It may be mentioned that essentially the same results, both as regards frequency of prompt and delayed deaths and the causes of prompt death, have been obtained in goats wounded by larger missiles. A few additional features of importance appear in such cases. Occasionally bullets, especially if they pass through ribs, have produced wounds of the chest wall that remained gaping and thus permitted more than evanescent communication between the pleural space and the outside air, with consequent rapid development of fatal pneumothorax. While fatal pneumothorax from wounding of the trachea, bronchi or lung parenchyma has not been observed in any of our animals, its possibility must be considered.

Also observed in some animals wounded with large missiles were very large traumatic defects in the diaphragm, produced by passage of the missile through that structure, through which herniated such large portions of the rumen or other abdominal viscera that adequate respiratory function was prevented, with prompt death of the animal. The two types of fatal traumatic lesions last enumerated differ from those previously mentioned in that they do not depend upon the existence of severe wounds of vascular structures.

Several readily conceivable fatal injuries that could be produced by missile wounds might be listed, although they have not been found in our animals. One is direct destruction of vital nervous centers, as already mentioned. Another is hemorrhage into the soft tissues of the neck or anterior mediastinum of sufficient magnitude to obstruct the trachea or interfere with the circulation to the brain. Fracturing of the cervical spine from a missile hit could certainly lead to severe compression of the spinal cord and death, even in the absence of subdural or subarachnoid hemorrhage. These and other easily imagined anatomical changes will not be discussed further, since they have not been demonstrated at autopsy in our material.

The mechanism of delayed death is almost always harder to elucidate on the basis of the anatomical findings, most such cases, indeed, lacking any unexceptionable explanation. The remarks made in this connection on the grenade cases continue to apply to the single-shot cases. This group, constituting 10 to 15 per cent of the animals wounded by missiles of weights up to 17 grains, deserves extensive clinical and physiological investigation, as well as more meticulous study at autopsy.

The animals living for 48 hours after wounding (with the exception of those having brain or cord wounds) appeared to be capable of indefinite survival. Since all survivors were sacrificed for pathological examination at or soon after that time, no statement can be made regarding possible late complications of the wounds. Without treatment, some cases of serious infection would no doubt have developed. A few animals with abdominal wounds might have succumbed to peritonitis. Lower nephron nephrosis was not observed in any case, but, of course, would hardly have been expected so early. (We have never seen that condition in goats, even after efforts have been made deliberately to evoke it.)

The findings in all of the cases here reported point up strongly the fact that the effect of wounding, either by single fragments or by a bursting grenade emitting many fragments, is determined primarily by what anatomical structures are struck by the missiles. The mere delivery into the animal's body of a large number of fragments, or of a large amount of energy by the missiles, will not have rapidly fatal, or even necessarily serious, results. Many cases have been observed in which a shift of a few millimeters in the path of the missile would have changed the outcome from prompt death to survival, or vice versa. The effectiveness of more or less uniformly distributed multiple hits, as opposed to a single hit, must be attributed to the increased probability that at least one fragment will produce a traumatic lesion of the kind just discussed.

## Summary and Conclusions

There are reported certain aspects of the autopsy findings on 34 goats wounded by the Mk. II grenade and 260 goats wounded by single missiles corresponding in size to the grenade fragments. The same general conclusions relating to survival time after injury and cause of death may be drawn from both sets of cases.

As a rule, the wounded animal either dies promptly (within one hour) or survives for at least 48 hours. Only an occasional animal still living after one hour fails to survive for 48 hours.

Prompt death from wounds of the head or cervical spine is associated with extensive subarachnoid hemorrhage, with or without direct wounding of the brain or spinal cord. When other parts of the body are wounded, prompt death is the result of massive hemorrhage, usually from grossly demonstrable wounds of the heart, the blood vessels or the liver.

The multiplicity of the wounds produced by the grenade is of no particular consequence in itself, insofar as prompt death of goats is concerned, but is of importance primarily because it increases the likelihood that at least one fragment will produce a serious wound.


"The demand for additional medical and dental schools is growing. Our population is increasing at a net rate of about 3 million a year, which means an ever-growing need for health services. It is estimated that to achieve in 1975 the same ratio of physicians to population that existed in 1955 it would be necessary to establish about 15 to 20 new medical schools of average size. The 1955 ratio was 132 physicians for every 100,000 people—approximately the same ratio that has existed for the last 30 years in spite of all the changes in medicine that have come about. There is a comparable need for additional dental schools."

—Aims C. McGuinness, M.D., Special Assistant to the Secretary for Health and Medical Affairs, Department of Health, Education and Welfare, at the Tenth Annual Meeting of the Middle Atlantic Hospital Assembly, Atlantic City, N.J., May 22, 1958.

# The Courageous Medics of Anzio, VI

*By*

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ON THE morning of 17 April, while I was making my daily rounds of the hospital area, I was notified by Colonel Wood of the 38th Evacuation hospital that he had received a message to the effect that I was to report to the G-1 at Corps Headquarters at 1100 hours. As it was nearly that time when I was informed I immediately returned to Nettuno and reported to Colonel John F. Cassidy, GSC, the Corps G-1. Colonel Cassidy told me that I was to be present in "Decoration Square" at 1100 hours to receive an award.

"Decoration Square" was on open area in Nettuno close by Corps headquarters. It had served as the market center of the town. At the appointed time I presented myself and found that I was in the company of Brig. Genl. Robert T. Frederick, Commanding General of the 1st Special Service force, Brig. Genl. Carl A. Baehr, Commanding General of the VI Corps Artillery, another brigadier general whose name I do not recall and there were three enlisted men. All of us were to receive decorations that morning.

At this ceremony, which was replete with a guard of honor composed of members of the VI Corps Military Police, the 3rd Division Band and attended by members of the Corps General and Special Staffs, I was presented with the Legion of Merit by major General Geoffrey Keyes, Commanding General of the II U. S. Corps and who had come to the beachhead representing the Fifth Army Commander, Lieutenant General Mark W. Clark, to present the awards. The award I received was in recognition of service performed at the time of the invasion of Italy in September 1943 when I brought my hospital (16th Evacuation Hospital) ashore and supported the VI U. S. Corps in the establishment of the beachhead at Salerno.

FIG. 35. Receiving the Legion of Merit award—17 April 1944.

During the ceremony naval vessels supporting the Corps artillery fired salvo after salvo at some enemy target. These heavy projectiles passed overhead and the ballistic cracks following their trajectory made it almost impossible to hear the citations as they were read by the VI Corps Adjutant General, Colonel Michael A. Conners, GSC. Following the ceremony I was honored by being invited to have lunch with the members of the Corps General Staff.

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The reported strength of the Fourteenth German Army on 14 March was 135,698 which included 65,800 combat troops. By 10 April the enemy combat strength had increased to 70,400.

The Germans seriously considered a renewal of offensive operations against the defenders of the Anzio beachhead. Plans drafted on 13 March provided for a large scale attack to be launched on 29 March

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either down the Albano road or directed against the beachhead from Cisterna. On 23 March the date of the projected attack was postponed and by 10 April the plan was abandoned. Field Marshal Kesselring was reluctant to commit his best reserves and General Mackensen judged that without these reserves a large scale attack could not succeed.

As the month of April wore on VI Corps artillery counter-battery fires increased in intensity; eight inch guns and eight inch and 240 mm howitzers had arrived on the beachhead. The beachhead anti-aircraft defenses were improved and Allied bombing attacks on gun positions reduced the effectiveness of enemy bombing and shelling of supply areas.

The enemy abandoned daylight air raids because they had become too costly. Nevertheless every night there were from one to a half dozen attacks. Enemy shelling, sporadic during daylight hours, substantially increased after dark. One night spent at Anzio dispelled all illusions of security on the beachhead. The battle of the beachhead remained a grim and deadly struggle to the end.

From the beginning of March the forward positions on the beachhead were stabilized and remained practically unchanged until the break-out in May. Conditions at Anzio resembled the quiescent periods of trench warfare experienced on the Western Front during World War I. The great bulk of VI Corps casualties were caused by enemy air raids and by enemy artillery, especially the latter.

The 3rd Division reported that 83 per cent of their combat casualties were caused by shell fragments. The VI Corps casualty report of 15 April can be considered as typical for this period. On that day there were 105 casualties; 20 killed, 83 wounded and 2 missing. This was slightly below the average of 107.5 per day for the month of April.

The existence of two 280 mm railroad guns were first reported on 24 March. These heavy caliber guns became known to everyone on the beachhead either as the "Anzio Express" or as "Anzio Annie." The sound of the firing of these guns and the noise of their heavy projectiles traversing the beachhead were so distinctive that they could be readily identified above the other shelling. Both during the day and night the dull, distant "BOOM" as these guns were fired, could be heard; followed by the "WHIRR" of the huge projectile as it slowly travelled over the front lines to land and explode with a deafening "WHOOSH" somewhere in the rear area. These guns were hidden in tunnels and were run out to fire and then quickly run back so that it was impossible for our air to spot them. (Our troops eventually caught up with these guns and captured them in the railroad yards at Civitavecchia early in June. Our bombers had made a shambles of the rail facilities and further withdrawal of these guns by the retreating German troops was made impossible.)

FIG. 36. Catching up with the "Anzio Express" at Civitavecchia—June 1944.

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The exact location by map coordinates of the hospital area had been given the commander of the German troops opposing VI Corps. It is believed that a conscientious effort was made by the enemy to prevent

their shelling and bombing of our beachhead medical installations. It must be remembered that many important military targets were crowded into the small area of the beachhead and as the build-up on the beachhead progressed these targets became more lucrative to the enemy. Occasional misdirected shells and bombs could be expected as being unavoidable. Thus casualties from this cause continued.

The 56th Evacuation Hospital seemed to be the target in the hospital area perhaps because of its central location. On 4 April artillery shells landed in the nurses' quarters area but no casualties occurred. Two days later, at about 1000 hours, the area was again subjected to artillery shelling at which time damage was done to the hospital post exchange and to one of the wards. Considerable damage was created in the enlisted men's quarters where direct hits were registered. However there was only one casualty resulting from this shelling. Tech. 5th Grade Pete Betley who had been on the night duty shift and was sleeping in his underground quarters lost both legs.

On the same night that the 38th Evacuation Hospital relieved the 56th Evacuation Hospital (9 April) shells landed in the area and made the newly arrived personnel conscious that the stories they had heard about Anzio and the hospital area were based on fact. Fortunately no casualties occurred. In fact, the 38th Evacuation Hospital suffered no casualties from enemy action during their stay on the beachhead.

The British hospitals continued to receive their share of destructive action by the enemy. On 13 April at about 0015 hours the 141 Field Ambulance which had suffered severely from enemy bombing on 17 March was shelled by enemy 88 mm artillery. As there was an air raid on the beachhead in progress at the time it was believed that the Germans were endeavoring to knock out the VI Corps anti-aircraft guns. One enemy shell landed in a ward and killed four patients and wounded four more. In the 21 CCS, a newly arrived unit, a patient was killed by an anti-aircraft splinter (flak). The operating pavilion in the 14 CCS received a direct hit by an anti-personnel bomb. The tentage and equipment were destroyed but no casualties were reported. On 3 May another anti-personnel bomb fell on a ward annex of the 14 CCS at which time a ward orderly was killed.

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Perhaps the most delightful evening I spent on the beachhead was when I was a guest of the Corps Commander at dinner in his quarters. At Anzio social functions were most conspicuous by their absence—so a night spent in this manner was a very special occasion. General Truscott lived in one of the few houses in Nettuno that escaped major damage. One Sunday evening in mid April at about 1830 hours Colonel "Bill" Thomas the Corps Engineer, who was the only other guest, and I called at the general's quarters. We were cordially received. General Truscott greeted us with, "Come in, gentlemen." As we entered the hallway he continued, "We'll hang our rank out here and what we have to say tonight will be entirely off the record."

The general was a congenial host. We enjoyed a few drinks together and then descended into the basement where he had his dining room. Captain Menkle joined us for dinner. After leisurely partaking of an excellent meal which was fully enjoyed we repaired back to the living room. We talked about many things but our conversation centered chiefly on the subject of morale, particularly the morale of the troops holding the beachhead. I learned of the high esteem which the Corps Commander held for the enlisted men of VI Corps. I was aware, too, that he entertained some ideas similar to those held by General Patton concerning battle fatigue. In our discussion I pointed out that there were conditions of battle fatigue and mental exhaustion experienced by our soldiers caused by the long periods of combat and harrowing experiences without opportunities for physical rest and re-

cuperation. I explained that not all of our anxiety state and combat exhaustion cases were physical or mental misfits. I proposed that the best prophylactic measure against these conditions was the affording an opportunity to the individual to enjoy a drink with congenial company. General Truscott voiced his whole-hearted agreement.

Our evening together passed all too quickly even though we did not depart until well after mid-night. It remains as one of the happiest memories of the Anzio beachhead.

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As the month of April drew to a close several changes in personnel became necessary. Lieutenant Colonel Johnson, the Commanding Officer of the 52nd Medical Battalion was hospitalized because of a serious heart ailment and had to be evacuated from the beachhead. Major Haggerty, the Battalion Executive Officer assumed command until the Fifth Army Surgeon sent Major Charles "Chuck" Wilkinson, Medical Corps, as a replacement. It was a pleasure to welcome Major Wilkinson to the beachhead and I was very well pleased to have him serving with me again. ("Chuck" had come overseas with me during the summer of 1942. At that time I had command of the 51st Medical Battalion (II U. S. Corps) and "Chuck" was my Adjutant.)

On 29 April, after expressing his desire to return to his original organization, my Deputy Surgeon, Lieutenant Colonel Brewster, was placed on temporary duty with the 36th Division and was subsequently transferred to that unit as the Division Surgeon. No replacement was immediately available for him.

About the first of May Chief Warrant Officer Keyes the chief clerk in the Corps Medical Section returned to the States on rotation. His place was taken by CWO Don Sutliffe by transfer from the Adjutant General's Section.

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One day early in May Colonel O'Neill, the Corps G-4, handed me three voluminous copies of VI Corps plans for the break-out from the beachhead. The code names for these operations were BUFFALO, TURTLE and GRASSHOPPER. Respectively, these plans called for a breach through the German positions in the direction of Cisterna, Albano and directly on Rome. The choice of plans depended on the availability of the 36th Division held in Army reserve on the Fifth Army southern front. The combat strength of the 36th Division was needed to augment the strength of VI Corps to insure a successful offensive operation. On 5 May, plan BUFFALO was adopted for the break-out of the Anzio beachhead. Essentially this plan projected a break through the Cisterna front toward Cori, at the base of the Lepini mountains, and Velletri Gap to Valmontone in order to cut Highway No. 6, the main supply route of the German Tenth Army. However, to deceive the enemy, preparations for all three plans were carried out.

All units, from divisions down to companies and separate detachments, of VI Corps busily prepared for their participation in the all-out Allied drive, during the first two weeks of May. My part, in this long awaited and anticipated action, was to provide medical support for the 36th Engineer Regiment charged with the responsibility for protecting the right flank of the VI Corps, east of the Mussolini canal and for the 1st Special Service Force which was to constitute the right flank of the attacking force with the mission of capturing Cori. Neither of these two units had organic medical supporting troops. Medical support of the normal troop complement of VI Corps was routine or "SOP."

To support the operations of the 36th Engineer Regiment and the 1st Special Service Force a medical plan was prepared. I proposed to use a platoon of Company "C" (Collecting) of the 52nd Medical Battalion and attach it to the 36th Engineer Regiment and a combined Collecting-Clearing Station, composed of Company "A" (Collecting) and

a platoon from Company "D" (Clearing) of the Corps medical battalion attached to the 1st Special Service Force. The 33rd Field Hospital was alerted and ordered to prepare for the closing out of the Corps Holding Hospital. The Field Hospital was directed to plan for the support of the attacking divisions of the VI Corps employing one platoon in direct support of a division. This was the same procedure that had been planned for this hospital four months previously.

Preparations were made on the beachhead for the establishment of the Fifth Army Advanced Command Post. The hill overlooking the harbor of Anzio on which was located the Villa Borghese was elaborately tunneled by the Fifth Army Engineer troops. The Fifth Army Medical Section was located in this underground labyrinth when it arrived late in May.

In the meantime Spring had come to the beachhead. The beaches at Anzio and Nettuno, only forty miles from Rome, had been the playground for the Romans, their "Atlantic City," prior to the war. Although the beautiful villas and hotels that crowded the water front had been destroyed by the months of enemy shelling and bombing and the beaches were still heavily mined and disfigured by underwater obstacles, the weather was perfect. It was again sunny Italy and it was good to find oneself still alive and in one whole piece after surviving the dismal winter weather and the harrowing events of the previous three months. There were times when most of us had been subjected to the "screaming meemies." But all that was past now. In the dilapidated gardens beautiful roses and other flowers bloomed. Everyone on the beachhead experienced a tremendous lift in morale and spirits occasioned not only by the invigorating spring weather but also by the thoughts of the impending break out from the confining boundaries of the beachhead. The eagerness, enthusiasm and confidence spontaneously instilled and engendered in the American and British troops of VI Corps certainly was heartening to the Corps commander and was a sure indication of the success of the imminent offensive.

Some of us at Corps Headquarters decided that we were fed up with our living in the subterranean dark and damp caves and although the Germans were still giving the beachhead unabated shelling and bombing we sought new billets in some of the buildings still standing on the beachfront. There wasn't much to choose from as the enemy had done a good job of reducing both Anzio and Nettuno to rubble but Major Karesh and I succeeded in finding a lower floor in a building and made it habitable by cleaning out the rubble and debris. We also dusted the place with DDT. This was my first experience with the new insecticide and I was amazed with the collection of bugs, flies, beetles and other various types of crawling and flying insects that succumbed to the lethal effects of this chemical compound. The vermin we collected I am sure would have challenged a good entomologist for their identification. By the middle of May the Corps Medical Section also moved above ground and was established in a building that still boasted of possessing a roof. All in all our situation had greatly improved.

The hospital area continued to be the center of medical activity. Casualties caused by enemy action were continually being generated but their daily number had decreased considerably. We had no particular problem with non-battle casualties. In this area of less than one square mile the following units were concentrated: Clearing Stations of the 3rd, 34th and 45th Divisions; the 3rd, 109th and 120th Medical Battalions (less their Collecting Companies); the 52nd Medical Battalion including the VI Corps Venereal Hospital; the 33rd Field Hospital operating the 400 bed VI Corps Holding Hospital; the 11th, 15th and 94th 400 bed, semi-mobile, Evacuation Hospitals; the 38th 750 bed Evacuation Hospital, the 549th Ambulance Company and the 402nd Collecting Company.

The work on mosquito control continued without abatement and the entire area occu-

pied by VI Corps was effectively ditched, oiled and sprayed. The magnitude of this effort was evidenced by the 27,000 linear yards of stream drainage completed by the VI Corps Engineers while Divisional Engineers added many thousands of additional yards to this figure. There were 187,000 linear yards of stream or 107 linear miles of water courses dusted with larvicide. The ingenuity displayed by the troops in devising various means to accomplish this task was really amazing—and most effective.

During the months of March and April the Allied armies in Italy were regrouped and prepared for an all-out spring offensive. During the same period the Germans worked desperately to complete two defensive positions, the Gustav line and the Hitler line. The enemy was exerting every effort to prevent a break through their lines, the obstacles that impeded the Allied march on Rome. The 85th and the 88th Infantry Divisions had arrived in Italy and received their battle indoctrination during the static period of the winter on the Fifth Army southern front. A shift in position placed the II U. S. Corps on the left flank of the Fifth Army (replacing the British X Corps) along the Garigliano River between the Tyrrhenian Sea and Highway No. 6. The 36th Division was held in the Naples area available and prepared to be deployed either to reinforce the II U. S. Corps on the southern front or to be sent by sea to augment the forces of the VI Corps on the beachhead.

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At 2300 hours, 11 May, the long awaited southern front offensive opened with a deafening artillery barrage. This artillery fire was directed on pre-selected targets which included enemy headquarters, command posts, communication centers and other salient points. In the morning with first light the Allied Air Force flew about 1500 sorties and continued the work of destruction of enemy positions.

The southern front at this time was manned by the Fifth and the Eighth armies. The Fifth Army under command of General Mark Clark consisted of the II (US) Corps, commanded by General Keyes, and composed of the 85th and 88th Divisions, two units which had not received their battle indoctrination, and the French Corps under the command of General Auguste Juin. The French Corps included the Algerian and Moroccan Divisions, skilled mountain fighters among whom were the Goumiers—native North African troops we had learned to respect for their fierce and tenacious combat tactics in Tunisia. The Fifth Army held that portion of the southern front which extended from the junction of the Liri and Garigliano Rivers south to the Tyrrhenian Sea. The British Eighth Army which occupied the right flank or eastern sector of the southern front was composed of troops of various nationalities including British, New Zealanders, Polish, Indian, Italian, Canadian and South Africans.

Immediately following the artillery and aerial attacks the ground troops all along the line surged forward, the French troops leading the way and gaining the high ground north and west of the river. In five days the French had advanced ten miles facilitating the capture of Cassino by the Polish troops and the fall of the Abbey of Monte Cassino on 18 May.

The success and momentum of the French assault supported the attack of the 85th and 88th Divisions which were slower in getting started. However these were two well trained divisions and spurred on by the success of the French divisions on their right they penetrated the German defense positions of the Gustav line in two days of hard fighting, but not without suffering heavy casualties. Once started, the troops of the Fifth Army gained momentum as their attack progressed. When forced out of the Gustav line the Germans fell back to the Hitler line only to be compelled to evacuate its fortifications and withdraw further north towards Rome. It was at this point in the offensive that the long, bitter and bloody struggle of the Anzio Operation was to reap big dividends.

While the offensive on the southern front was gathering impetus and its success assured, the strength of VI Corps was being "beefed up" by the arrival on the beachhead of Combat Command "B" of the 1st Armored Division bringing that division to its full strength. Staff officers of the 36th Infantry Division also arrived including the Division Surgeon, Lieut. Colonel Brewster. We believed that the 36th Division (held in Army reserve in the Naples area) would support the VI Corps action since the Fifth Army attack on the southern front was making favorable and rapid progress. (If the reader desires to learn of the "behind the scenes" actions which influenced the course of action of the VI Corps in its break out of the beachhead I suggest that he read Chapter 15 of General Mark Clark's book, *Calculated Risk* published by Harper & Brothers, New York.)

Colonel Brewster and I went on a reconnaissance for a site on which to locate the 36th Division's 111th Medical Battalion. As the area of the beachhead had not been enlarged and no other favorable site could be found it was decided to locate the 36th Division Medical units initially in an area north of but adjacent to the hospital group. The 36th Division and the 361st Regimental Combat Team of the 91st Infantry Division arrived on 22 May and were destined to play a decisive role in the VI Corps capture of the Colli Laziali which opened the door leading to Rome.

The long awaited "D" day for VI Corps was set for the 23rd of May. Preparations for breaking out of the beachhead had been carefully made. Elements of the 52nd Medical Battalion had joined the 36th Engineer Regiment and the 1st Special Service Force. Patients from the Corps Holding Hospital and the Corps Venereal Hospital were either returned to duty, if physically fit, or transferred to Army evacuation hospitals to continue their treatment.

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"H" hour for the VI Corps offensive was set for 0630, 23 May 1944. At 0530 hours on the morning of 23 May I was awake early and, dressing in a hurry and skipping breakfast, I climbed to the roof of the Hotel de Ville in Nettuno to witness the Corps artillery barrage directed against the enemy defenses along the Cisterna front. I noticed that the flat roof of the building was covered with fallen flak. Promptly at 0545 hours every piece of artillery at the Corps command let loose and pounded the enemy lines for three-quarters of an hour. The artillery fires were augmented by tank fire. At 0630 hours American tanks and infantry troops emerged along the front from Carano to the Mussolini Canal to launch the attack. The day of liberation from the beachhead had arrived!

The initial VI Corps planned assault was launched through the front held by the 34th Division with the 1st Armored Division on the left, the 3rd Division in the center directed towards Cisterna and the reinforced 1st Special Service Force headed for Cori. The 45th Division's objective was to penetrate beyond Carano as far as the Cisterna-Campoleone railroad. The 36th Division was held to exploit a break through the enemy defenses. This assault was aimed at seizing the high ground in the vicinity of Valmontone and cutting Highway No. 6, thus assisting the progress of the British Eighth Army up the Liri valley and cutting off the escape route of the Germans retreating from the southern front. The 1st and 5th British Divisions were detached from VI Corps the day before the attack was launched and under Fifth Army control were to break out local attacks designed to deceive the enemy as to the main course of the beachhead offensive and to contain enemy forces opposing them.

On the day prior to the launching of the VI Corps attack General Clark opened his advanced command post in the newly constructed caves in Anzio. General Martin and members of the Army Medical Section also arrived on the beachhead at that time and they were joined by Lieut. Colonel Briggs, RAMC, and his clerk from my office.

The attack of the VI Corps surprised the

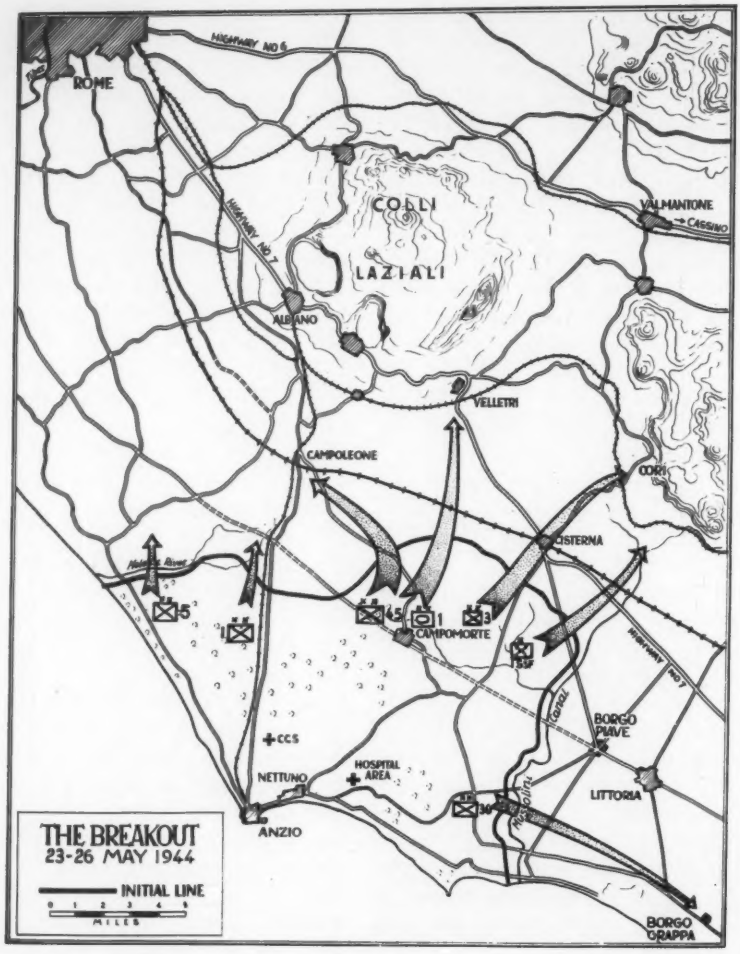


FIG. 37.

Germans and initial progress, under cover of the smoke from the artillery barrage and the early morning haze, was good but enemy resistance stiffened and the mine fields that had to be traversed took a heavy toll of American tanks and personnel. Early air support had to be curtailed because of weather conditions but before the day was over 722 missions were flown in support of the Corps attack. Cisterna was heavily bombed. By noon of 23 May the 1st Special Service Force had cut Highway No. 7 below Cisterna and by evening of the first day of the offensive the 1st Armored Division had crossed the Cisterna-Campoleone railroad and smashed the enemy main line of resistance in that area.

During the first day of the fighting Company C (Collecting), 52nd Medical Battalion, established a Collecting Station west of the Mussolini Canal on the Nettuno-Borgo de Piave road to support the 36th Combat Engineer Regiment (Task Force Brett), which advanced to the southeast along paral-

lel roads designated as, "Short," "Long," "Silver" and "Ground." Company A (Collecting) and one platoon of Company D (Clearing) of the 52nd Medical Battalion, operated a Collecting-Clearing Station three miles northeast of Conca for the reception and treatment of casualties from the 1st Special Service Force. The 3rd Platoon, 33rd Field Hospital, was prepared to move forward to support the 3rd Division as soon as the divisional clearing station was established in the forward area.

Having reached their objective on the first day of battle VI Corps troops continued their attack on 24 May and drove beyond the railroad cutting Highway No. 7 above Cisterna. The town was now virtually encircled but vicious fighting for its possession still ensued. On the following day the German defenses in rear of the town fell and Cisterna was captured by the 3rd Division. Nearly 1,000 prisoners were taken. By nightfall of the third day of the attack both the 3rd Division and the 1st Special Service Force had reached the base of the Lepini mountains before Cori and Velletri, facing the entrance to the Velletri Gap which led to Valmontone. On this same day contact was made between Task Force Brett of VI Corps and the 91st Reconnaissance Squadron of II Corps at Borgo Grappa on the Anzio-Terracina road. Thus the forces of the VI and the II Corps were joined and the beachhead of Anzio was no longer isolated.

The continued success of the offensive permitted the medical support of the attacking divisions to move forward out of the hospital area. The first unit to advance was the 3rd Division Clearing Station which moved to a site one mile east of Cisterna after the capture of that town. I immediately dispatched the 3rd Platoon of the 33rd Field Hospital to support the Clearing Station in the same vicinity. The Headquarters and talion was moved to the vicinity of Crocetta. The Corps medical battalion had the mission of evacuating casualties from the forward divisions to the Army hospitals. The Headquarters of the 109th Medical Battalion and the

FIG. 38. VI Corps Objective (Lepini Mountains in background).

Clearing Station of the 34th Division were established two miles northwest of Cisterna, west of Highway No. 7. I sent the 2nd Platoon of the 33rd Field Hospital to support the 34th Division Clearing Station in the same area. The 47th Medical Battalion (1st Armored Division) initially located Company A one mile east of Crocetta, later moving it to the northwest of Carano; Company B went into operation south of Campomorto and Company C about one and one-half miles north of Cisterna.

Upon the arrival of General Martin and members of his staff on the beachhead, arrangements were made for the Army medical service to assume its normal responsibility in the evacuation of the divisional clearing stations. Sites were also selected for additional evacuation hospitals which were already on their way both by land and by sea to support the assault on Rome. The 16th Evacuation Hospital was scheduled to arrive by sea on 26 May and was to be located in the hospital area in rear (north) of the 94th Evacuation Hospital. The 93rd and 95th Evacuation Hospitals were returning overland to the beachhead. Sites were selected for the 93rd at Le Ferriere and for the 95th an area two miles east of Cisterna.

On the fourth day of the VI Corps' assault (26 May) the 1st Armored Division advanced to within two miles of Velletri. The 3rd Division raced through the Velletri Gap with its reconnaissance units reaching

the outskirts of Artena, only three miles from the goal of Valmontone and Highway No. 6. The 1st Special Service Force had captured Cori and was advancing through the Lepini mountains abreast of the 3rd Division. Although Artena was captured on the following day the VI Corps advance came to a temporary halt. The scheme of the VI Corps offensive carried the 3rd Division and the 1st Special Service Force across the front of both the II (U.S.) and the French Corps to Highway No. 6, the axis of advance of the British Eighth Army. The II and French Corps advancing from the southern front were blocked. With the arrival of forward elements of the II Corps the plans for the continuation of the Fifth Army attack had to be recast. At this point, too, the enemy had recovered somewhat from the surprise and confusion of the Allied attack and some German units were counterattacking.

The highly successful offensive of VI Corps in breaking out of the beachhead was nevertheless costly in losses both in men and materiel. During the first five days of the attack combat casualties exceeded 4,000, almost twice as heavy in killed and wounded as during the five days of the big German attack of 16-20 February. Enemy losses were even far heavier although no figures are available for the number of enemy troops that were killed and wounded. We learned that the Germans burned great numbers of their dead. VI Corps troops captured 4,838 prisoners during this period and also great quantities of enemy materiel.

The 16th Evacuation Hospital arrived in the port of Anzio on the morning of 26 May. The unit was still in command of my former Executive Officer, Lieut. Colonel Philip A. Daly, Medical Corps. It was good to welcome so many of my old associates to the beachhead. The personnel of the hospital staged with the 38th Evacuation Hospital while Army Engineer troops prepared their new site. All tents—ward, operating and personnel—were dug in and sand-bagged in a manner similar to the other hospital units and the operating facilities were covered with flak proof roofs.

After the first five days of the fighting the rear areas of the beachhead were comparatively safe from enemy artillery action. The air strip could now be used and C-47 transport planes began arriving on 26 May. These planes were used for the evacuation of casualties from the beachhead. Between 26 May and 5 June there were 4,795 casualties evacuated by air.

On 26 May, General Clark issued new orders to VI Corps which reshaped the nature and direction of its attack. The main axis of the assault which had been directed towards Valmontone was shifted to the west of Coli Laziali with an initial objective to seize a line from the Factory at Carroceto to Lanuvio. Velletri was being stubbornly held by the enemy. The new plan called for the 34th Division to direct its attack towards Lanuvio (northwest) while the 45th Division made its assault towards Campoleone Station (west). The 1st Armored Division was allotted the task of continuing the attack on Velletri but was subsequently (28 May) shifted to the left flank of VI Corps to strengthen the attack of the 45th Division. The 36th Division moved in before Velletri on 27 May and the 36th Combat Engineer Regiment was brought up and placed in the line between the 34th and the 36th Divisions.

After the capture of Artena the 3rd Division assumed defensive positions prepared to ward off any counterattacks by the Herman Goering Panzer Division. With the arrival of the II Corps in the area and the initiation of a new plan of assault by VI Corps the 3rd Division and the 1st Special Service Force on 30 May were detached from VI Corps and attached to the II Corps. The II Corps assumed the mission of continuing the attack on Valmontone and securing Highway No. 6. The 3rd Platoon of the 33rd Field Hospital which had been supporting the 3rd Division was retained by VI Corps and remained on site to care for its non-transportable wounded. The elements of the 52nd Medical Battalion attached to the

1st Special Service Force were relieved and returned to the control of the Corps Medical Battalion Commander.

On the 30th of May time was taken out by the Army Commander to hold a brief but impressive Memorial Day service at the Nettuno cemetery. It was quite fitting that in the midst of a desperate struggle for the Alban hills and the road to Rome that we paused to pay tribute to our comrades who had paid the supreme sacrifice in defending the Anzio beachhead.

Major General Morrison C. Stayer, Medical Corps, who had replaced Brig. General Fred Blesse, Medical Corps, as the Surgeon of NATOUSA visited the beachhead and was billeted at the 15th Evacuation Hospital. I called for him one morning at 0700 hours and we started out in my jeep for a tour of all divisional medical installations. There had been no rain for several days and the dust was very thick. I am quite sure that General Stayer will always remember his tour of the beachhead.

When we entered Cisterna, which had been the target of Allied bombing and shelling for four months, we found the town to be a complete shambles. It was with great awe that this Italian town was viewed after its capture. It was in the environs of Cisterna where the brave Ranger force disappeared during the initial attack from the beachhead late in January. That attack was suddenly aborted. It was from this area too that one of the major enemy efforts to wipe out the beachhead was generated.

The enemy was hard pressed and experienced great difficulty in rounding up a sufficient number of their dispersed troops to check the American advance. The enemy was forced to withdraw to a new defensive position extending from Ardea through Lanuvio and Velletri to a line before Valmontone. German units were ordered by Hitler to hold this line at all costs. In the reshuffling of units the mountainous region of Colli Laziali east of Velletri was left temporarily denuded of enemy troops; the Germans had concentrated their depleted forces in defense of Lanuvio and Valmontone.

General Truscott informed General Clark of the weak gap in the enemy line along the base of Colli Laziali and the Army Commander moved quickly to exploit this defect in the German defenses. Late in the evening of May 30 troops of the 36th Division started to climb the steep slopes of the hill mass east of Velletri. Their progress was undetected by the enemy. By dawn of 31 May American troops had made a deep penetration that flanked the German forces defending Velletri and Valmontone. Not a shot had been

FIG. 39. Cisterna—25 May 1944.


FIG. 40.

fired! When the Germans discovered this dangerous breach of their defensive position they counterattacked but the 36th Division held to its key position which outflanked the main enemy line of resistance. The enemy finding their positions untenable were forced to withdraw and the advance on Rome continued.

The 45th Division had reached Campoleone village by 29 May and the 34th Division was at the outskirts of Lanuvio on the same date. On 30 May, the 45th Division with the 1st Armored Division on its left flank fought bitterly but unsuccessfully along the Albano road all day. The attack of the 34th Division before Lanuvio had been stopped. Enemy resistance was especially stiff on this portion of the VI Corps front.

The German forces occupying the Colli Laziali were now separated by the 36th Division's penetration and their ability to defend their positions was hopeless. Nevertheless they fought tenaciously and did their best to hold on for three more days (31 May-2 June). This was the Germans' last stand before Rome. When the 36th Division succeeded in reaching the central heights of Colli Laziali and the II Corps swept around the north of the mountain mass the enemy were forced to pull out. On the night of 2-3 June the Germans began their general withdrawal to the north leaving only scattered rear guards to impede the Fifth Army advance.

The 3rd Platoon, 33rd Field Hospital, which had been in support of the 3rd Division, was moved on 4 June into the Colli Laziali near Grotticelle to support the 36th Division. The Headquarters and 1st Platoon of the 33rd Field Hospital were moved to the Factory area at Carrocetto to support the attack of the 45th Division and the 1st Armored Division. The Factory itself was found to be a mass of unrecognizable rubble. Elements of the field hospital moved into the same area occupied by the 120th Medical Battalion and 45th Division Clearing Station. Some delay in setting up the hospital was experienced because of the presence of numerous mine fields which had to be cleared before being occupied. Activities had to be confined to areas within the white tapes erected by the Engineer troops. This portion of the beachhead battlefield had been the scene of the bitterest fighting during the four long weary months that the troops of the VI Corps and the enemy had engaged in for its possession. Situated on a slight rise in the flat terrain it had been successfully held by the Germans throughout the struggle and played a dominant role both in denying the Allied troops the road to Albano and in acting as a spring board from which the Germans launched their vicious but unsuccessful attacks down the Albano road. In surveying the area I found it to be actually littered with bodies of recent dead and of those, both Allied and German, who had fallen in this "No Man's Land" during the beachhead campaign. Bodies of American and German dead still lay where they fell. These were the military personnel who had previously been reported "missing in action." Earlier recovery of their bodies was impossible because of the endless mine fields sowed

FIG. 41. Grave of "Unknown American Soldier" found in "No Man's Land." Soldier buried by the Germans.

by both Allied and enemy forces and of the combat activity that ensued here. Many wooden crosses were in view on which were inscribed either, "Unknown American soldier" or "Unbekannt." There were also evidences of hasty burials while there were still bodies practically mummified which lay where they paid their supreme sacrifice.

On 3 June all units of the Fifth Army hastened after the retreating enemy. On the morning of 4 June the first American troops reached the outskirts of Rome and early in the afternoon both the 1st Armored Division and the 36th Division moved in to occupy the Italian capital city. By the end of the day all German troops were cleaned out of the area south of the Tiber river from the sea to the junction of the Tiber and Aniene rivers above Rome. Within twenty-four hours troops of both the VI and II Corps were in pursuit of the fleeing enemy north of the Tiber. The 3rd Division was relieved from combat and assigned the mission of garrisoning the city.

With both Highways Nos. 6 and 7 now available to Fifth Army to move supporting troops, more medical units arrived in the area. The 8th Evacuation Hospital and Army N.P. and V.D. hospitals were established between Campomorto and Le Ferriere. The 12th Medical Depot Company moved in the area adjacent to the 93rd Evacuation Hospital at Le Ferriere and the 56th Medical Battalion arrived to augment the Army evacuation service. The 38th, 56th and 95th Evacuation Hospitals were prepared to move into Rome.

*"My God! Here they wuz an' there we wuz."*
*By Permission*

FIG. 42.

Events occurred in rapid succession following the liberation of Rome and the deep withdrawal of the enemy forces to the north of Italy. Platoons of the 33rd Field Hos-


FIG. 43. Entrance to the Eternal City.

pital moved with the Clearing Stations of the 34th, 36th and 45th Divisions although holding units had to remain behind until the remaining patients were able to be evacuated to Army evacuation hospitals. During these days I spent most of my time riding in my jeep, traveling hundreds of miles each day, maintaining liaison with the various elements of the medical service in a fluid situation.

After a brief one night's stay in the vicinity of Velletri the Headquarters of VI Corps moved into an Italian barracks at Cecchignoletta in the southeastern section of the city of Rome. I had my first view of the Eternal City on 5 June as I drove north on Highway No. 7, the Appian Way, and emerged from the Alban hills near Frattocchia. At the time I was endeavoring to contact the 36th Division and found the divisional Clearing Station in operation near the Ciampino Air Field. Destroyed enemy trucks were still ablaze along the highway.

Entrance into Rome was an indescribable event. It was amazing to me to find that it was not unlike any American city I knew. After more than a year and a half spent in seeing nothing but the rubble and devastated towns in North Africa, Tunisia and Italy it was difficult to conceive that Rome had been spared a similar fate. The other large city of Italy, Naples, I had passed through certainly did not escape. The Roman populace were dressed in their Sunday best; women wearing silk printed dresses and all smiling and welcoming their liberators; a total absence of the signs of war except for us, the troops. It was difficult to drive through the wide-clean streets. Every jeep, truck, and tank was "mobbed" by the admiring Romans. There was no rubble in the streets and the city itself bore few scars of the war. Only the railroad yards had been damaged—a credit to Allied Air Force precision bombing. After the long, weary months spent on the Anzio beachhead Rome was indeed a Utopia to the troops of VI Corps.

FIG. 44. Villa Dori Pamphili—VI Corps Hq. in Rome.

Within a few days preparations were made to move VI Corps Headquarters above Rome. An advance command post was set up at San Marino but the fighting days for VI Corps in the Italian theatre were numbered. VI Corps was to be relieved from active combat for the purpose of rest and an administrative reorganization which had been delayed while the Corps defended the beachhead.

Relief of the VI Corps was effected by the IV Corps at 1200 hours on 11 June. Lieut. Colonel Jay Palmer, Medical Corps, the Surgeon of the IV Corps was briefed on the dispositions of VI Corps medical installations and the Corps Surgeon's responsibilities. Headquarters of VI Corps was then moved to the grounds of the Villa Pamphili situated on a hill on the west bank of the Tiber river overlooking Vatican City. The headquarters occupied the villa and quarters for Corps personnel were provided both in the villa and on the beautifully landscaped grounds. There could be no comparison with the dungeons below Nettuno which we had abandoned only a few days before. I chose to live in a small wall tent out of doors rather than in the villa. The fresh air and warm sunshine were exhilarating and conducive to shedding the pallor I had acquired,

FIG. 45. My quarters at the Dori Pamphili—Rome.

a distinguishing feature obtained from living in the wine caves of Nettuno.

On 14 June, Headquarters of VI Corps was reorganized under T/O & E 100-1, 15 July 1943 and Changes 3, 10 April 1944. The Corps Medical Service was drastically affected by this reorganization. The Corps Medical Battalion (52nd Medical Battalion) was eliminated; thus the Corps no longer contained a medical battalion as part of its organic troops. The 52nd Medical Battalion was subsequently relieved from duty with the Corps and became a part of the Fifth Army Medical Service. The positions of the Corps Dental Officer and the Corps Veterinary Officer were also eliminated. With great regret we lost Major Karesh and Major Mossman from our Medical Section. These two officers were relieved from duty with the Corps Headquarters and transferred to the Replacement Depot in Naples for reassignment. The new table of organization provided two new officer spaces for the Corps Medical Section—that of two Medical Administrative Corps officers, both in the grade of Major.

Headquarters of Fifth Army moved from Anzio to Tarquinia. On 20 June I visited the Fifth Army Surgeon and discussed with him the reorganization of the Corps. I also at that time requested that the two new spaces for Medical Administrative Corps officers be filled. I was successful in obtaining Captain James L. Rounds, Medical Administrative Corps, who had been my Registrar in the 16th Evacuation Hospital, and Captain Sigfrid G. Kinkopf, Medical Administrative Corps, the Adjutant of the 8th Evacuation Hospital. The new T/O & E for the Corps Headquarters Company (T/O & E 100-2, 15 July 1943, Change 1, 27 December 1943) provided for a Medical Detachment consisting of one Medical Corps officer, one Dental Corps officer, and eight enlisted technicians, Medical Department. Dispensary service for the Corps Headquarters personnel had previously been furnished by the Corps Medical Battalion.

The time spent in Rome was utilized by attendance at conferences affecting the reorganization of the Corps and briefings on the next task to which the Corps was to be assigned. We were informed at a staff conference by the Corps Commander that the next mission for VI Corps was operation "ANVIL," the amphibious invasion of Southern France. The target area was to be the Gulf of St. Tropez and the date—15 August 1944. VI Corps was to become a part of the newly reorganized Seventh Army for this new venture and I was destined to participate in my third amphibious operation.

There was sufficient time available to per-

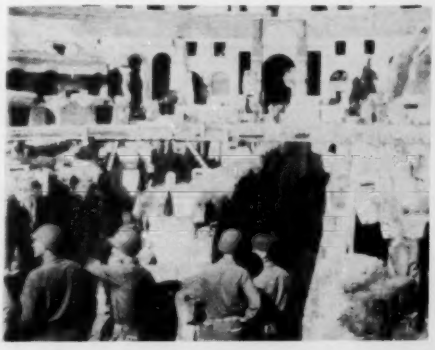

FIG. 46. American Troops Visit the Coliseum—Rome.

mit us to visit many of the historic places of interest in Rome. Three suites of rooms were made available to the Corps staff at the Hotel Excelsior which became a rest center for officer personnel of the Fifth Army. Visits to Vatican City, St. Peter's, the Coliseum, the Forum, the Catacombs and the Sistine Chapel with an audience with His Holiness, Pope Pius XII, were just rewards to the liberators of the city.

On 24 June the Headquarters at VI Corps closed in Rome and moved back to Bagnoli in the Naples area to take up its new task, planning for Operation "ANVIL."

41

With the capture and liberation of Rome, Operation "SHINGLE" was crowned with final success. The grim defense of the Anzio beachhead by the American and British troops of VI Corps ended in a victory over the German war machine in central Italy. In this bloody drama the personnel of the Medical Department fulfilled its mission of binding the wounds and saving the lives of those who made this success possible. A heavy price was paid by the medical personnel. Ninety-two were reported killed in action, including six nurses; 387 were wounded; 19 were captured and 60 were reported missing in action. The heroic actions of these officers, nurses and enlisted men have been described as accurately as memory and available records have enabled me to do. Every individual worked for the common interest—the conservation of our Allied man power on the beachhead.

The professional accomplishments of the medical personnel serving on the beachhead had few precedents. Between 22 January and 22 May, 18,074 U. S. soldiers suffering from disease; 4,245 injury cases and 10,809 battle casualties—33,128 patients in all—were given comprehensive care in United States Army hospitals. During this same period, 14,700 casualties from all causes among British forces were hospitalized in British medical installations. From D-day to the day before the final offensive, 23,860 American and 9,203 British casualties—in all, 33,063 patients—were evacuated by sea from U. S. and British hospitals on the beachhead without injury or loss of life of a single patient in the process of their movement from the hospitals to the waiting ships—despite the fact that the port area was under constant fire.

From 23 May to 5 June, 15,200 casualties from all causes were cared for in American hospitals and 2,196 were treated in British hospitals. During the same period, 14,130 patients were evacuated from the beachhead by sea and air to bring the total number of patients evacuated to 47,193.

No impressive array of figures can accurately express the total character of the medical accomplishments. In this narrative I have tried to portray the actual conditions under which this task was performed.

Community of effort between American and British personnel, always existent in the Fifth Army, was further advanced on the Anzio beachhead. British casualties were treated in American hospitals whenever necessary. The British 12th Field Transfusion Unit provided whole blood from its own resources to all beachhead hospitals during the period from D-Day until 25 February. On 25 February the first shipment of whole blood from the U. S. Blood Bank in Naples arrived at Anzio and continued to arrive in a steady flow thereafter, being delivered by whatever means was available, ranging from a Piper cub plane to a U. S. Navy destroyer. All blood on the beachhead was distributed by the British 12 FTU. In the period 22 January to 4 June, 10,624 pints of blood were used in American hospitals, an average of one pint per 2.01 battle casualties and 3,685 pints of blood were used in the British hospitals where the average was one pint per 2.95 battle casualties.

With the successful break out of the beachhead all medical units welcomed the opportunity to be on the move and keep pace with the rapid advance of the troops they served. As these units moved forward and passed through the former German positions

which had kept the VI Corps forces in check, they looked down from the heights of the Coli Laziali and marvelled at the miracle of their survival.

As long as memory exists, these men and women of the Medical Department, the Courageous Medics of Anzio, will not be forgotten by the grateful host of men they served.

## EPILOGUE

Ten years ago, while attending a conference in Washington, I read a news item which appeared in the Washington *Evening Star*. It was date lined, "Anzio Beach, Italy. August 26, 1948 (CDN), and the article was headlined, "Italy Exempts Tourists in Drive on Swim Suits with Bare Midriffs". The news story which had attracted my interest stated:

> "Here, 35 miles south of Rome where Amercian troops made beachhead landings after Sicily and Salerno in World War II, sun bathers are being required to keep their middles under cover. Females must wear one piece suits.
>
> * * *
>
> "Anzio beach, once noted for its abbreviated swim suits and summer relaxation, is becoming a Keystone comedy. There is everything here except the custard pie. Cops in khaki sidle up to people stretched out on Anzio's sands and listen. If a foreign tongue is being spoken, or even Italian with a bad accent, nothing happens. "But blue tickets are forthcoming for all improperly clad natives.
>
> * * *
>
> "Of an estimated 200,000 here for the weekend about 75 per cent were obviously doing their utmost to comply with the law."

While we occupied the beachhead I often tried to imagine what this Roman playground was like during normal and peaceful times. At the time, I know that I entertained little thought that, if I survived, I would return to this part of the world.

A few days ago (8 April 1958), I was afforded the occasion to revisit the scene of the of the Anzio campaign. Taking advantage of some leave and with my wife, my daughter, Kathe, and some friends, I toured the Italian peninsula and covered the route traversed by the U. S. Fifth Army from the beaches of Peastum, along the Gulf of Salerno, to the rocky fastnesses of the Brenner Pass. At Paestum I had the opportunity to walk along the beach and point out where I had brought my hospital unit (16th Evacuation Hospital) ashore on the afternoon of D-Day (9 September 1943) and where, in the dunes, we had dug ourselves into the sand, for several days until sufficient real estate had been wrested from the enemy so that we could establish our hospital. We visited the site of our initial establishment north of Roccadaspida Station. The olive orchard, to which General Clark had hastily moved his forward headquarters when he was forced out of his position by the determined German effort to drive us back into the sea, is still there. However, it was rather difficult to single out the open field we had occupied almost fifteen years ago. The area, where we had operated our hospital for six weeks during September-October, 1943, has since become a thriving real estate development.

We subsequently visited the other two sites, one in Caserta and the other at Vairano, where we had set up our hospital while I commanded the unit. Travelling along Highway No. 6 we saw the new Cassino and we took the time to drive to the top of Monte Cassino to see the Abbey which has also been completely rebuilt.

For me, the return to Nettuno and Anzio during our visit to Italy was a very special occasion. As we drove north on Highway No. 7, the Appian Way, from the Salerno-Naples area, I was able to describe the military operations that had taken place during the Anzio campaign, from the crossing of the Garigliano River to Cisterna, I found that Cisterna, which had been pounded and reduced to rubble, had been rebuilt. I noted that a new statue graced the central square—I well remembered that the original statue

had been decapitated and otherwise disfigured.

While driving towards Nettuno from Cisterna many familiar landmarks could be identified. The destroyed houses on the Pontine plain have all been replaced by new structures and the whole area created the appearance of rural and agrarian prosperity. I was amazed at seeing the number of new and thriving vineyards that covered the former battlefield and "no man's land". But the area where our hospitals were located during the Anzio campaign has reverted to a barren waste.

The day of my visit to Nettuno and Anzio was much the same as the Easter Sunday of 9 April 1944 when the 38th Evacuation Hospital arrived on the beachhead to replace the 56th Evacuation Hospital. It was another beautiful and sunny spring day with still a chill in the air. The beaches were unoccupied and I was denied the opportunity of seeing any bathers in abbreviated swim suits. I must admit that I was a bit disappointed.

In Nettuno we went to the public square where I experienced no difficulty in seeking out the entrance to the wine caves which had been my abode on the beachhead. I readily found the steep and long stairway leading down to the caves, which I had used, but I had some difficulty in convincing the present owners of the premises of my desire to descend into the nether regions. After quite an interesting and prolonged palaver I obtained their permission to descend the long stairway. With the aid of a flash light, which I had purposely taken on the trip for this occasion, I, at long last, had the opportunity to take my wife, my daughter, and my friends down into the subterranean passages beneath the town and to show them the niche where I had lived, with other members of the VI Corps headquarters staff, for almost four months while we occupied the beachhead. If I thought that the wine caves were an inhospitable place to live, as I have already described in this narrative, they were even more so when we saw them a short while ago. The underground passages are no longer used for the storage and the aging of wine. We found the place littered with trash and debris. The members of my family and my friends were visibly impressed and we did not tarry there.

We next visited the American Cemetery which lies in a shallow valley at the north edge of Nettuno. It is located in the same area that served as the VI Corps cemetery which was established on 24 January 1944. The cemetery now covers 77 acres of land and is the final resting place of 7,862 American soldiers and sailors who made their supreme sacrifice during the Sicilian, Salerno and Anzio campaigns.

After entering the cemetery through the handsome bronze gates we stopped at the Visitors' Building. On the wall over the registry desk has been placed a framed letter sent by the President of the United States at the time of the dedication of the cemetery and memorial which were completed in 1956. I copied the content of that letter and present it as a part of this narrative:

THE WHITE HOUSE

WASHINGTON

July 7, 1956

For the dedication of the Cemetery and Memorial at Nettuno.

With the American people, I join in paying homage to the gallant Americans who rest in the cemetery at Nettuno being dedicated today. Many of these noble men, together with their comrades-in-arms from the British Commonwealth, made the landing on the nearby shores of Anzio. They died there valiantly and heroically, giving their lives that the peoples of Europe might be liberated from tyranny. They rest tranquil and secure in the friendly soil of Italy. May our great debt to them, and to all others who died in the cause of freedom, serve as an inspiration to all peoples to dedicate themselves to assuring freedom and lasting peace.

DWIGHT D. EISENHOWER

The American cemetery is a beautiful and impressive site. It is nicely landscaped with a small, clear stream (the Fossa del Tinozzi) flowing through the northern area supplying the water for a pool and cemetery needs. The architects for the cemetery and memorial were Gugler, Kimbal & Husted of New York City and the landscape architect was Ralph Griswold, of Pittsburgh, Pennsylvania. Beyond the entrance gates and extending up the gentle slope is the broad pool with its island and cenotaph and the mall which extends between the grave plots to the Memorial at the far (west) end of the cemetery. The 7,862 headstones are arranged in gentle arcs which sweep across the broad green lawns. I noted that every headstone was of exactly the same height.

The Memorial consists of the chapel to the south, the peristyle and the museum room to the north. On the east face of the chapel is a sculpture panel in relief by Paul Manship of New York representing, "Remembrance". It portrays an angel bestowing a wreath upon the graves of those who gave their lives for their country. On the east facade of the museum is a similar panel, "Resurrection", also by Paul Manship. It symbolizes the dead soldier as he is borne to his reward by the guardian angel.

The chapel was intentionally designed without windows. The entire interior walls of the chapel are of white marble and covered with the engraved name, rank, organization and State of 3,094 of our Missing. Over the apse, as the heading for these lists is engraved:

HERE ARE RECORDED THE NAMES OF AMERICANS WHO GAVE THEIR LIVES IN THE SERVICE OF THEIR COUNTRY AND WHO SLEEP IN UNKNOWN GRAVES

The ceiling dome of the chapel, designed by the architects and executed by Paul Manship and by Bruno Bearzi of Florence uses the medieval signs of the Zodiac to represent the constellation. Represented also are the planets Mars, Jupiter, and Saturn in the relative positions which they occupied in the heavens at 0200 hours on 22 January 1944, the historic moment when the first American and British troops landed on the beaches near Anzio.

In the museum portion of the memorial an octagonal table occupies the center of the room. In this table is set a circular relief model of Italy, at 1:500,000 scale. The model is bronze, with marble mosaic in various shades of blue in the sea areas. It was fabricated by Bruno Bearzi and shows in general outline the American military operations in Sicily and Italy during the period 1943-45.

The east and west walls of the museum are occupied by maps. The west wall contains three maps; "The Capture of Sicily", "The Strategic Air Assaults", and "The Naples-Foggia Campaign". On the east wall is one large map showing, "The Landing at Anzio and the Capture of Rome". All of these maps were designed by Carlo Ciampaglia, of Middle Valley, New Jersey and executed by Leonetto Tintori of Florence. The topographical details are faithfully depicted in perspective, as are various types of ships and aircraft which contributed to the success of the operations. The maps on the walls were executed in truefresco; this procedure involves the mixing of pigments with the plaster as it is applied to the wall. This disappearing art was widely used in the Middle Ages in the production of many murals which had lasted through the ensuing years. There are many evidences of the permanence of these paintings to be seen throughout Italy.

Before leaving the cemetery we slowly walked between the row on row of carefully attended graves. As I passed these headstones, marking the graves of the fallen, my thoughts returned to those who had served on the Anzio beachhead; to my friends and comrades-in-arms who had served there with me. Tears welled in my eyes as I recalled those who had given their last full measure of devotion to their country on the fields that surrounded the cemetery. The words of the immortal Lincoln, uttered at Gettysburg at

the time of the dedication of that battlefield cemetery almost a hundred years ago, came to my mind—

> . . ."But, in a larger sense, we cannot dedicate—we cannot consecrate—we cannot hallow—this ground. The brave men, living and dead, who struggled here, have consecrated it far above our poor power to add or detract. The world will little note nor long remember what we say here, but it can never forget what they did here . . . that from these honored dead we take increased devotion to that cause for which they gave the last full measure of devotion." . . .

After leaving the cemetery we drove through Nettuno and Anzio noting that most of the scars of the war had been erased. I observed that the many destroyed buildings had mostly been replaced by new structures or were otherwise restored. There were still some gaps which gave evidence of the terrific shelling and bombing to which these two towns had been subjected. Leaving Anzio behind us we drove north on the Albano road towards Rome, passing the British cemetery on our right. As we drove through the first and second underpasses I pointed out the scars on the abutments—the scenes of desperate fighting during February of 1944 when the Germans made their determined effort to drive down this highway and eradicate the Anzio beachhead. As we continued towards Rome we saw that Aprilia and Campoleone were completely rebuilt and now consisted of modern architecture.

Reaching Albano on the west slope of the Colli Laziali we stopped and looked back to survey the beachhead from this point of vantage which had served the enemy so well. There I took a last, long, lingering look at the Anzio beachhead. The memory will never fade.

*(Concluded)*

## THE ROAD TOLL OF 1957

38,700 Deaths . . . 1,300 Less than 1956
2,525,000 Injuries . . . 157,000 more than 1956
850,800 Casualties from speeding
229,700 Pedestrian Casualties . . . 3,380 less than 1956
15,670 Deaths occurred on weekends . . . More than 40% of the total
26.9% of the drivers involved in fatal accidents were under 25 years of age
2,563,700 casualties from traffic accidents—Highest total in history
More than 34% of the casualties occurred on weekends
More than 85% of the vehicles involved in accidents were passenger cars

# EDITORIAL

## Prescription for Survival

A NUMBER of us have been meeting in the Palais des Nations in Geneva as the World Health Organization's Study Group on the Mental Health Aspects of the Peaceful Uses of Atomic Energy. This problem is just one of those which is concerning mankind very extensively. It is one of the things with which mankind has not yet made its peace and learned to live comfortably—but then, there are many other problems too which man has not yet solved. This one enjoys special attention because it points up many of the problems that have not yet been solved.

They can all really be seen in one context. Man is always, as are all other animals, in a test situation. It is a question really of man's capacity to adjust to rapidly changing circumstances, to adjust soon enough, and effectively enough, so that he may survive. All animals, always, are in this same test situation. Many forms of life have not been able to adjust completely and satisfactorily and, in each case when they failed to do so, they died out. Man has not yet proven his permanent habitation in this earth; he may not be able to make adequate adjustment to rapidly changing circumstances. On the other hand, his capacity undoubtedly will enable him to do so if he learns to use this capacity for all it is worth.

THE PRESCRIPTION. Of course, man has a tremendous undevolped capacity for effective living. He has a brain capacity that has shown him how he should do things in order to survive; it is quite clearly written in the Constitutions of the specialized agencies of the United Nations and in the Charter of the United Nations itself. One might recognize those documents as a sort of minimum prescription for human survival in this generation.

Unfortunately, man has a very common tendency to avoid implications. He recognizes that extensive things have to be done; he recognizes that many ways are going to have to be changed in order that man may live with reasonable security in a new kind of world. But then he tends to shirk the consequences, to run away from the implications which relate to his own behaviour and, of course, also to his own comfort.

THE PURPOSE. So, commonly, men all over the world, having set up the United Nations, regarded it as a brave new magic, a new organization that would look after everything. It would prevent anyone attacking anyone else, it would provide security for everyone, it would see that everyone had sufficient of whatever they needed, that no one would be hungry, that everyone would buy our surplus production, whatever its kind, at very good prices, and that everyone would be willing to provide us with whatever natural resources or raw materials we needed at very low prices, and everyone would live happily together.

This, of course, is a child-like attitude depending on primitive magic which does not exist. The United Nations, of course, is an instrument available for the people of the world to use for one purpose only, i.e. for mutual help for everyone's good. Whenever anyone tries to use this instrument for other purposes, such as national prestige, national power, or to get an advantage over someone else, it does not work very well because it was never designed for that purpose.

Mankind for a very long time has been refusing to accept uncomfortable facts and has developed astonishing ways of avoiding such implications. The first reaction to a problem

by a mature person, or a mature nation, of course, is rationally to think out and consider all the factors concerned and then to make decisions for the welfare of everyone. Not just for himself, not just for the welfare of that sort of group which is defined by entirely irrelevant considerations, such as race or colour or creed, or economic status, or ideology, or something of that kind, but thinking in the larger terms of the welfare of everyone.

Our Ignorance. Of course, man feels very small and helpless in the face of great problems and he tends to run away rather than to think—and there are very many ways of running away from problems. We see that all over the world now, in large numbers of people who are refusing to accept the facts that are very clearly in front of them. In this new kind of world, with different conditions of survival, and where very necessary changes are staring us in the face, many people are avoiding them by going back to old social patterns, old political patterns, old religious patterns. They are insisting on conformity so that everyone should be exactly the same and no one should experiment. Or they show touching, but quite misguided, faith in legislation or organization, or they think it will be effective to submit themselves to a dictator or a strong-man or go back to some authoritarian religious pattern. Actually, none of these things will enable anyone to cope with the situation of the world today.

What has to be done is very much more difficult but, in the end, is the only sort of thing that can be effective. It is, in the first place, to learn to live with our ignorance—because we still are ignorant. This, of course, is the "scientist's" point of view. He does not feel impelled to "make-up" answers in areas in which he has no acceptable evidence. He leaves his mind wide open for conviction, or wide open for consideration, and makes up his mind whenever evidence is satisfactory and whenever he feels that there is enough good evidence to give him a working basis, so that he can believe in something, at least until he gets further evidence.

This Little Earth. Man is going to have to learn to live comfortably and effectively no matter how quickly changes take place in his immediate surroundings. That means that we are probably going to have to be very much more careful than we have ever been in the past, not to give our small children absolute rules in childhood which may not be applicable when they are grown up. It may be that their world will be very different indeed from the world we can see now, and it may not be at all useful to them, and to the world in which they live, if we impose limiting loyalties on them, if we give them the idea, for instance, that they should concern themselves only with local welfare, or that their concern should stop at national boundaries. It is quite clear, surely that we are now moving very rapidly toward a world community where loyalty to any group less than the whole human race, and on any scale smaller than this little earth, will not be of service to the human race and, therefore will not be of service to the individual either. Because that is true we are going to have to help our children to develop way beyond our capacity; and that means primarily liberating them from very many of the "certainties", the "local loyalties", the "absolute convictions"—the sort of things to which almost all of us were exposed in our childhood. We must leave them free to develop way beyond our capacity so that they can cope with the things that we are not quite developed enough, not quite mature enough, not quite enough able to act as world citizens to cope with effectively.

Brock Chisholm—WHO—
(Vol. XI, No. 1, Jan.-Feb. 1958)

# Around the World

(Ser. II, No. 22)

*By*

CLAUDIUS F. MAYER, M.D.

VIET-NAM's political events of the last decade caused an alarming displacement of the Indochinese, and an *overpopulation of South Viet-Nam.* The concentration of people is especially dangerous in the larger towns. Thus, in Saïgon-Cholon the number of inhabitants in 1945 was 450,000 only; in 1952 it climbed to a million and a half, and early in 1955 to more than two million. This rapid increase, especially south of the 17th parallel, called for urgent measures to safeguard public health. These steps included the reconstruction and sanitary modernization of old slum districts, the building of many dispensaries, child-welfare posts, etc. In July, 1952, a new Labor Law was promulgated by the Viet-Nam Government which also regulated the health and safety of workers, and increased their *social security.* In 1953, the Law was also extended to agricultural work. It provides free medical care for the plantation workers, too.

Similar shifts of the native population occurred also at various other parts of Asia, thus especially after the collapse of the Indonesian government last year. The nearby *Australia is afraid* that, with its twelve million white people, it will not be able to resist the billion or more Asians if they decide to take Australia. By the way! The *Indonesians need doctors* desperately. Their country has about 80,000,000 people but only 1,500 doctors of medicine. Hence, the Indonesian Government was advertising in Australia with the hope of making a short-term service attractive to the Australian doctors. Those who wish to tie themselves down for three years are reimbursed for the expenses of tropical outfit, and travel. The monthly salary is 450 rupiahs for first-year graduates, 1,075 rupiahs for those who have nearly twenty years of medical experience. The recruiting of foreign doctors continues at the embassies and/or legations of Indonesia.

In a way, the fear of Australia is not unreasonable. The *world population* increased by about 172 million during the years 1951 to 1955. This is equal to a daily increase of about 118,000 persons, or an annual rate of 1.7%. The total world population is now over 2.7 billion. Several centuries ago the population growth was much slower: an estimated 0.4% between 1650 and 1850, and a rate of 0.8% between 1850 and 1950. Since the end of World War II, the world's growth is mostly due to the rapid decrease of death rate in such undeveloped areas as Africa, Asia, and Latin America. The new billions added to the human horde may reach 6 billion by the end of this century, and 13 billion by 2050. Experts in demography are worried because the population of the world also *becomes poorer and poorer,* and, with the extent of education, people who have never known anything but poverty are becoming resentfully aware of their economic situation.

The Asian disturbances have again brought to the attention of the medical officers of European troops the *peculiarities of amebiasis.* During the turbulent years of 1949-1955, French officers of the Colonial Medical Corps noticed that the usually solitary type of *tropical liver abscess* occurred more and more often in a form of many small abscesses on the surface and throughout the liver parenchyma. In the various formations of the Expeditionary Corps of Indochina, 409 cases of tropical liver abscess were treated, of which 109 were of the multiple variety. Most cases were seen in South Viet-nam, in the hospitals of Saïgon, and they are somewhat an etiological and pathogenetic puzzle. Doctors of the surgical services of the Saïgon hospitals marshal many reasons

for an amebic origin of the multiple suppurations in the liver. Of course, this makes us believe that the amoeba and other protozoa may behave differently according to the geographical areas.

Amebiasis is a diagnostic puzzle for Dutch doctors, too. To the Netherlands, the disease is sometimes *imported by soldiers* who had service in the Colonial Army, in Indonesia. During the past ten years, the Central *Military Hospital at Utrecht,* where the cases usually land for diagnosis, observed 172 military patients suffering from various forms of amebiasis: dysentery in 65, other intestinal ailment in 48, liver ailment in 31, and other forms of amebic infection in 28. The Dutch army doctors try to follow the French (?) slogan that "the first requirement of the diagnosis of amebiasis is reasoning".

*Singapore,* in spite of its tropical climate, is a very healthy place in Asia. There is no malaria, very little hookworm disease, no severe malnutrition, and no prevalence of serious diseases. Thus, it is an ideal place to investigate the nature of the mysterious disease called *tropical anemia.* An investigator studied the behavior of the blood in the poorer mothers of Singapore after parturition. Many now mothers were tested for hemoglobin and hematocrit values of blood cells, in the free wards of the Kandang Kerbau Hospital; but all values were in accordance with the figures found in women of the countries of a high standard of living and of a temporate climate (mean Hb 11.85%; mean hematocrit value 35.3%). Thus, tropical anemias must be due to other causes than climate.

A few years ago, at a meeting of the French Medical Academy, the *exogenous factors of cancerization* were discussed, and the need for protective measures was pointed out. The number of deaths from malignant tumors is steadily increasing all over the world. One important cause in the progress of cancer is the ever wider use of, or exposure to, cancerigenous substances. Lung cancer chiefly attacks the smokers, the workers in chromium plants, in asbestos and nickel factories, and the miners who inhale radioactive dust. Cancer of the digestive organs amounts to 50% of all cancer cases in the industrialized countries, while its incidence was about 3½% among primitive people. In Viet-Nam where the chewing-betel is colored with aniline dyes, 49% of the digestive cancer is localized in the mouth.

The *ingestion of chemical products,* and especially *food colorants* constitutes the main danger in cancerization. Most food products in America and Europe contain such added artificial coloring agents. Often, these agents are frankly cancerigenous. The yearly consumption of colorants is estimated at 6 gm. per person in Belgium. The wrapping containers of food products are also frequently cancerigenous, such as bakelite, cellulose, cellophane, etc. Hence, during the last decade, many countries became worried about these agents, and many of them established prohibitory regulations. Yet, certain economic interests are everywhere in opposition. It is therefore desirable, said the French Academy of Medicine, to establish a special Commission to overcome this opposition of industry and commerce.

About these *food additives,* which are used to improve the appearance, flavor, texture, or storage properties of the various food articles, we may justly worry. Are they perfectly harmless? Is their potential hazard to health fully compensated by their economic effect in preventing wastage of seasonal surpluses? Even though the food additive may be nontoxic at a certain specified concentration, there may be still a large group of persons who, for one reason or another, may be specially sensitive to a particular additive. A *Joint Committee of FAO and WHO,* stressing the importance of legal control over the additives, believes in the principle that the consumer should be clearly informed of the presence of additives, and that a proper organization should be established for the enforcement of the regulations. (During last July, American Food Lawyers and British food technologists also had a discussion on

the control of chemical additives to foods.)

It is surprising to learn from a Technical Report of the WHO that 30-40% of all deaths occurring in the age groups of 1–19 years are due to accidents, or to unpremeditated events resulting in an injury. Of course, *accidents in childhood* produce different mortality rates in the various countries. The highest mortality rate from accidents in the examined age groups occurs in the United States (37%). In a number of other states, every third child-death is due to accidental injury we may say (Australia, Canada, Germany, Netherlands, Sweden, Switzerland). In Japan (12.8%) and especially in Ceylon (3.9%), accidental death is very rare among children. Since the death rate by accidents is on the increase among the children of the world, especially in the *higher motorized countries,* is is hoped that a united effort by education, engineering, and law enforcement will increase the safety, and will eliminate the hazards of our daily life.

Dentists must be very familiar with the name of Dr. *Albert GYSI* for his research in dental prosthetics. His *articulator* is used all over the world by dental technicians. He was lately an honorary professor of the Zürich Institute of Dentistry until his death in late 1957 at 93 years of age.

The Latin American state of *Colombia* is thoroughly contaminated with *intestinal parasites* which attack about 88% of the population, regardless of age, race, social position, etc. In Medellin, for instance, 73.4% of the better people, and 90.36% of the poor people harbor intestinal parasites while the Department of Antioquia is 95% contaminated. There are more than 20 different types of intestinal parasites well represented in this country. Some of them even invade the hepato-bilary tract, and Ascaris is a very frequent finding in the liver.

Among the *Chinese, rheumatic heart disease* is quite common. It is more prevalent in the northern and central parts of the country than in the South. The incidence varies from 1.5% to 5.5% of all medical admissions in the hospitals. At the *Hung Yen Hospital in Shanghai,* 660 patients with rheumatic heart diseases were treated during 1949–1954, while at the Szechuan Medical College Hospital 51.2% of all cardiovascular admissions were for rheumatic heart diseases in 1955.

With such a prevalence of rheumatic heart disease in all iron-curtain countries, it is no wonder that the surgery of the heart made excellent progress in the countries of Marxism-Leninism, and that all thoracic surgeons made special efforts to make the cardiac interventions as safe and as "dry" as possible. The ideal aim is the *creation of an artificial heart* which would work better than the pumps of the Anglo-Saxon and western cardiac surgeons. At the November session of the *A. V. Vishnevsky Institute of Surgery* in Moskva it was announced that, with the aid of physicians and engineers, a perfect apparatus was finally constructed which works as a lung and a heart at the same time, and allows the surgeon to prolong the heart operation indefinitely (for hours) without any risk to the patient. Prof. Vishnevsky himself stated that, with the aid of the new apparatus, whose name of initials is *NIIEHAiI,* he performed the first "dry" mitral commissurotomy. The apparatus was shown by the director of the Scientific Research Institute for Experimental Surgical Devices and Instruments. It is claimed to be principally different from the American heart pumps. Its construction is supposedly based upon a *mathematical equation* which takes into consideration the role of blood-vessels in the circulation of the blood. The Soviet engineers and physicists who took part in the development of the "artificial heart" had to study physiology to be able to create the new surgical apparatus. The plan is to manufacture six such apparatuses at the present time, and to distribute them to eminent surgeons of Russia. Each "heart" will cost about 50,000 rubles. (It is heard that a somewhat similar apparatus was also developed at the Surgical Clinic of Pozsony, or Vratislava, by Karol Siska, Director of the clinic.)

Among all European western countries,

in only three is the subject of *occupational medicine* a part of the *curriculum of medical students*. These countries are Belgium, the German Federal Republic, and Sweden. In these countries, preventive and social medicine are also parts of the undergraduate education. Many countries of the world are in need of better undergraduate education in industrial hygiene and medicine. Even in *India* where health education is nil and health care is inadequate, *industrial medicine* developed on the initiative of the (often European) industry. Unfortunately, the big and small industries started to close down their medical services as soon as the State of India introduced its health insurance system. It is the feeling there that, even with a universal health insurance, industrial health service should remain and should be expanded for the rehabilitation of the workers (tuberculosis, epilepsy, heart disease, injury).

In Soviet Russia, the first *institute for occupational diseases and industrial hygiene* was opened at Moskva in 1923. There was no industrial medicine in Czarist Russia. Now, there are ten such institutes *in the Russian Commonwealth*: at Leningrad, Gor'ky, Sverdeovosk, Ufimsk, Kharkov, Kiev, Donec, Krivorozh, Tbilis, and the central institute of the Academy of Medical Sciences which is an outgrowth of the Moskva institute. The central institute became part of the Academy in 1945. It has a hygienic, a clinical, a radiological and a physiology of work section, and an experimental station at Berezov for the fight against silicosis. Each division has many subsections. The staff has 133 coworkers of whom 18 are doctors of science, professors, 71 are candidates of medical sciences, 44 workers have no degrees. They published a total of 2,647 articles. The industrial hygiene institutes at Ufimsk and Krivorozh were organized only in 1956. The first one is for the interests of the petroleum industry chiefly, the latter for the mining industry. This indeed shows that the science of occupational and industrial medicine is very well developed in the U.S.S.R.

In Albania, the *Tirana State University* was formally opened last September, and the little satellite where before World War II about 75% of the people were illiterate now has an institution for higher education. The Albanian school system, with about 3,200 schools, takes care of a little more than a quarter of a million pupils who are brought up entirely according to the Soviet system. It is reported that the *pharmaceutical industry* is also growing in Albania. Ten years ago, everything had to be imported. Last year, more than 200 different drugs were manufactured in the country. The pharmaceutical plants here are outfitted with the most modern machines which come from Russia and the other satellite countries, perhaps also from Hungary.

Among the various branches of chemical industry in *Hungary, the pharmaceutical branch* also shared in the general increase in industrial production. The Deputy Minister of Heavy Industry recently stated that drug manufacture in Hungary was today six times larger than in 1950. Many new preparations were put on the market in 1956/57, such as degranol (a drug against tumors), isolanid (a cardiac), rausedyl and redergam (for regulation of blood pressure), a vitamin $B_{12}$ preparation, chlorocide (for infectious diseases), exactin (for rheumatism), suprastin (an antihistaminic), hibernal (for neurologic purposes). The three largest drug factories were renovated for several hundred millions of forints. Today, the Hungarian pharmaceutical industry puts out more than a billion forints' worth of medicaments annually. A huge warehouse for pharmaceutical products, which was built of prefabricated elements, will open in August 1958. The Minister remarked, however, that more than two thirds of the Hungarian products were exported "abroad" in 1957. This is certainly surprising since a couple of years ago the Hungarian drugstores were not able to fill a prescription even for a Dover's powder.

The *annual growth of medical literature* is now tremendous. There are about 13,000 pe-

riodicals of medical interest which publish about one million articles annually. A German medical magazine finds that in Western Germany alone an average of 700 new German medical books are published on a total of 150,000 pages. The German medical journals add to this another 110,000 pages annually. Or, a total of 260,000 pages of new German medical literature a year! Where would a G.P. find spare time to read even one tenth of this flood of literature? Of course, much is just repetition since the nature of research requires repetition. Thus, on penicillin alone, the last decade has produced 40,000 articles.

Just to make the long list of medical journals a little longer, the Laboratory Animals Bureau of the MRC Laboratories in London published a *Mouse News Letter* in which many laboratories from all over the world publish information about the strains of mice they maintain, reports on inbred strains, mutant genes and linkages, etc.

In Lima, a *little Peruvian girl became mother at 9 years* and 8 months of age. The girl, named Hilda Trujillo, was in her 8th month of pregnancy last December when she gave birth to a daughter after 5 hours of labor. The newborn weighed 3 kg. Records of the delivery are kept at the Maternity Hospital of Lima. The pregnancy was noticed in the 5th month. The young mother was examined by many specialists, and was found absolutely normal, except slightly advanced beyond her age. It may be recalled that about 18 years ago *another unusual birth* was described in Lima. Then, the mother was Lima Medina who became pregnant at an age of 5 years and 8 months, and her son was delivered by Cesarean section when she was 6 years and 5 months old. Now, she is 24 years of age, and the secretary of Dr. Gerardo Lozada who delivered her baby. And the baby? He is now a big boy, 18 years old, who just matriculated at the University of Lima . . . *Multa paucis!*

## BOOK REVIEW

THE CLAY PIGEONS OF ST. LO. By Glover S. Johns, Jr., Colonel, Infantry U. S. Army. Military Service Publishing Co., Harrisburg. 1958. Price $5.00.

There were hundreds of Infantry Battalions fighting in Europe during World War II, on paper each a stereotype of the other. On the battlefield each had a similar operational role, yet every action was different from the preceding one and from that of any other battalion.

Col. Glover S. Johns, Jr., has taken one battalion, the 1st Bn., 115th Infantry Regiment of the 29th Infantry Division, and has described its life during several weeks leading to the capture of St. Lo. He was the battalion commander, and his personal diary makes this story a text book for small unit leaders. He has realistically projected many of the experiences understood only by those who had lived them.

The ever-present threat of death, the utter physical exhaustion after sustained relentless pressure on the line, and the intense emotion of inter-personal relationships of men under combat stress are presented in an understanding yet objective and critical manner. In addition, Col. Johns has demonstrated the role of the leader with its constant evolution, its conflicts, the pressure of decisions, and the loneliness of the privilege and responsibility of the final decision.

As Surgeon of another 29th Division Regiment, I had the good fortunte to know Colonel Johns while the "Clay Pigeons" were under fire at St. Lo. This story carried me back to the greatly underrated hedgerow country in France. Events and emotions were presented factually. This true story makes exciting reading and is highly recommended.

COL. E. G. BEACHAM, MC, MD, NG.

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# The Sir Henry Wellcome Medal and Prize

## COMPETITION FOR 1958

THE competition is open to all medical department officers, former such officers, of the Army, Navy, Air Force, Public Health Service, Veterans Administration, The National Guard and the Reserves of the United States, commissioned officers of foreign military services, and all members of the Association, except that no person shall be eligible for a second award of this medal and prize and no paper previously published will be accepted.

*The award for 1958, a medal, a scroll, and a cash prize of $500, will be given for the paper selected by a committee composed of the Association's vice-presidents which reports on the most useful original investigation in the field of military medicine. The widest latitude is given this competition, so that it may be open to all components of the membership of the Association. Appropriate subjects may be found in the theory and practice of medicine, dentistry, veterinary medicine, nursing and sanitation. The material presented may be the result of laboratory work or of field experience. Certain weight will be given to the amount and quality of the original work involved, but relative value to military medicine as a whole will be the determining factor.*

Each competitor must furnish six copies of his paper which must not be signed with the true name of the author, but are to be identified by a *nom de plume* or distinctive device. These must be forwarded to the Secretary of the Association of Military Surgeons of the United States, Suite 718, 1726 Eye St. N.W., Washington 6. D.C., so as to arrive at a date not later than 1 July 1958, and must be accompanied by a sealed envelope marked on the outside with the fictitious name or device assumed by the writer and enclosing his true name, title and address. The length of the essays is fixed between a maximum of 10,000 words and a minimum of 3000 words. After the winning paper has been selected the envelope accompanying the winning essay or report will be opened by the Secretary of the Association and the name of the successful contestant announced by him. The winning essay or report becomes the property of the Association, and will be published in MILITARY MEDICINE. Should the Board of Award see fit to designate any paper for "first honorable mention" the Executive Council may award the writer life membership in The Association of Military Surgeons, and his essay will then also become the property of the Association.

# ASSOCIATION NOTES

Timely items of general interest are accepted for these columns. Deadline is 3rd of month preceding month of issue.

## Department of Defense

*Ass't Secretary* (Health & Medical)—HON. FRANK B. BERRY, M.D.

*Deputy Ass't Sec'y*—HON. EDW. H. CUSHING, M.D.

SELECTIVE SERVICE

The Department of Defense has requested the Selective Service System to provide 10,000 men during June 1958 for assignment to the Army. The June call is 3,000 less than the number previously planned for the month and is explained by the increase in number of voluntary enlistments.

MEDICARE

The Department of Defense has requested $80 million for the Medicare Program for Fiscal Year 1959. The average costs per day per patient has been estimated at $50.25. This figure, of course, includes more than just the hospitalization as there is the physician's bill and other items that enter into the cost.

There have been over one million claims submitted under this program, the one millionth claim having been recently received.

## Army

*Surgeon General*—MAJ. GEN. SILAS B. HAYS

*Deputy Surg. Gen.*—MAJ. GEN. JAMES P. COONEY

GENERAL FORSEE HONORED

Brig. General James H. Forsee, MC, was given the annual Certificate of Merit Award by the University of Missouri General Alumni Association in St. Louis on April 15.

General Forsee is Chief of the Department of Surgery and Chief of Professional Service at Walter Reed Army Hospital, Washington. He received his medical degree from Washington University in St. Louis in 1929, after which he entered the Army Medical Service. During World War II he was commanding officer of the Second Auxiliary Surgical Group which saw duty in Africa, Sicily, Italy, France and Germany.

He is author of numerous professional articles on thoracic surgery and pulmonary tuberculosis. His book, "The Surgery of Pulmonary Tuberculosis" which he wrote in 1954, has been translated into Japanese.

HONORED

Colonel Leland G. Meder, Assistant Chief of the Dental Division, Office of the Surgeon General of the Army, received the Logan Memorial Award presented by the Loyola University School of Dentistry at its 75th Diamond Jubilee Homecoming anniversary banquet recently. Colonel Meder is an Alumnus of the University.

The Award was established this year in memory of Dr. William Hoffman Logan, Chief of the Army Dental Corps in World War I and prominently identified with dental education during his lifetime.

MEDICO-DENTAL SOCIETY

The Southern European Task Force Medico-Dental Society met with Italian physicians and dentists at Camp Passalacqua, SETAF Headquarters, in Verona, Italy, on April 2. Captain Kenneth Rowe, President

of the Society said, "This is the beginning of a broad exchange of information and views between American and Italian doctors and dentists on a voluntary informal, people to people level."

The presiding officer of the meeting was Lt. Colonel George W. Brabiak, SETAF Dental Surgeon. Colonel H. Beecher Dierdorff, USAREUR Dental Surgeon, gave a talk on maxillo-facial injuries.

### INTESTINAL BIOPSY CAPSULE

Lt. Colonel William H. Crosby, Chief of the Department of Hematology at the Walter Reed Army Institute of Research has developed an "Intestinal Biopsy Capsule." This stainless steel, bullet-shaped capsule, was originally designed to obtain biopsy specimens from the small intestines of patients suspected of being "sprue" victims to eliminate the need for major surgery.

The capsule has two chambers and is attached to a plastic tube. This is swallowed and when the device reaches the proper position in the small intestine suction is applied to the outside end of the tube; this sucks a small bit of the intestinal mucous membrane into a window of the capsule. At the same time a spring activated knife blade snaps shut and cuts off a tiny piece of the tissue. The capsule is then retrieved by pulling on the plastic tubing.

Although the capsule was devised primarily for obtaining biopsies from the intestines of sprue sufferers, it has been found to be of great value in obtaining specimens from such other areas as the stomach and esophagus.

### PROMOTION

Effective July 1 the Army will adopt the "best qualified system for promotion to the grade of major. This will not be applicable to the Medical, Dental, Nurse, and Medical Specialist Corps Officers.

Previously the "fully qualified" system was in effect for promotion, and, of course, still applies to the grades below major as well as those officers in the above mentioned corps.

This means "promotion is based on potential to perform the duties of higher grades; not a reward for service." Every military person should always regard his position as not just a job but one of great responsibility in which he is representing a democracy. His one aim should be to be a better and better servant of that democracy. With this in mind he can become one of the "best qualified."

### IRRADIATED FOOD

The Army has begun a two-year test program at Fort Lee, Va., to establish troop acceptability of irradiated food. The tests are designed to determine soldiers' reaction to taste, texture, and other sensory characteristics of irradiated meats, fruits, and vegetables.

### D-DAY HISTORY

Persons who participated in the D-Day (6 June 1944) invasion are asked to write to Miss Frances Ward, *Reader's Digest*, 230 Park Ave., New York. A history is being prepared for publication. Only those engaged in the operation for the 24 hours starting midnight June 5, 1944 are requested to communicate.

### RESERVE DUTY

The Army is now requiring a longer tour of duty in the Ready Reserve for obligated prior servicemen who do not serve in National Guard or Army Reserve drill units after leaving active duty.

Under current law, all men who entered the active Army after August 9, 1955, acquired a six-year service obligation including a maximum requirement of five years to be spent on active duty and Ready Reserve status. The sixth year these individuals are transferred to Standby status.

Last year the Army reduced the five year portion to four years in order to bring the required service more in balance with the

six-month training program for Reserve volunteers. Now, under the new plan, Reserve obligated men will have to earn the quicker release to Standby Reserve by full participation in Army Reserve training.

## Navy

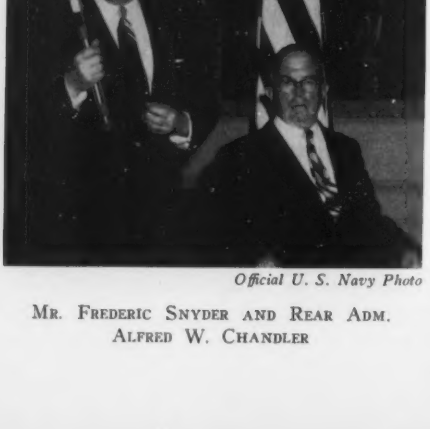
*Surgeon General*—REAR ADM. BARTHOLOMEW W. HOGAN
*Deputy Surgeon General*—REAR ADM. BRUCE E. BRADLEY

HONORED

Rear Admiral Alfred W. Chandler, Dental Corps, U. S. Navy (Retired), was presented a scroll by the National Lafayette Baton Committee in recognition of his leadership in naval dentistry recently at the National Naval Medical Center. Formerly Chief of the Dental Division and Assistant to the Chief of the Bureau of Medicine and Surgery for Dentistry, Navy Department, Admiral Chandler joins a group of selected individuals whose names have been placed on the National Lafayette Honor List for their leadership in various fields of endeavor. The list honors the memory of the Marquis de Lafayette.

During his 35 years of continuous active duty in the Navy Dental Corps, Admiral Chandler's interest was centered in the field of dental education where he worked to improve the training program for dental personnel.

The ceremonies were conducted by Mr. Frederic Snyder, Committee Chairman and nationally known editor, lecturer, and publicist. Other participants were Rear Admiral Robert Armstrong, USN (Retired), who represented the Bethesda-Chevy Chase Rotary Club; Dr. C. Willard Camalier, Past-President of the American Dental Association; and Dr. Manly Michaels, Past-President of the Washington Section, American College of Dentists.



*Official U. S. Navy Photo*

MR. FREDERIC SNYDER AND REAR ADM. ALFRED W. CHANDLER

RETIRED

Captain W. Leona Jackson, Nurse Corps, U. S. Navy, who was Director of the Navy Nurse Corps for a four year period since May 1, 1954 was placed on the retired list of officers of the Navy on May 1, following almost twenty-two years of service.

She was appointed in the Nurse Corps of the Navy on July 6, 1936. She was in Guam when it fell to the Japanese in December 1941, and was taken prisoner of war. She was transferred to Japan and was returned to the United States on the Swedish liner *Gripsholm* in August 1942 with the first exchange of the diplomatic staffs.

A native of Union, Ohio, she will make her home there.

## Air Force

*Surgeon General*—MAJ. GEN. DAN C. OGLE
*Deputy Surg. Gen.*—MAJ. GEN. OLIN F. MCILNAY

PIN-UP GIRL

Dr. Richard W. Bancroft and his colleagues at the School of Aviation Medicine, Randolph Air Force Base, Texas, have the picture of Sharon Manning, Colton, California, as their pin-up girl.

It all happend this way. Sharon wanted information on space medicine and asked the

school for guidance. She was sent pamphlets and brochures which further stimulated her interest. Then came the technical questions about oxygen deficiency at high altitudes. Here is where Dr. Bancroft and his associates came in the picture. The help they gave Sharon enabled her to be judged the first-place winner in the biological division at the Inland Science Fair, Southern California. She also won a scholarship in the nationwide Westinghouse Science Talent Search.

She wrote the school, "I am giving you one of my senior graduation pictures. It is the only way I can thank you."

### SPACE SYMPOSIUM

The Space Symposium sponsored by the Air Force School of Aviation Medicine to be held in San Antonio, Texas, November 10, 11 and 12 will bring together specialists in every aspect of space exploration, with emphasis on man's imminent venture beyond the Earth's protective atmosphere, and the necessary conditions for his survival.

Co-chairman of the Symposium are Major General Otis O. Benson, Jr., who commands the School and Dr. Hubertus Strughold his advisor for Research. The Southwest Research Institute of San Antonio will conduct the meeting with C. W. Smith, assistant to the President, as secretary.

## Public Health Service

*Surgeon General*—LEROY E. BURNEY, M.D.
*Deputy Surg. Gen.*—JOHN D. PORTERFIELD, M.D.

### COST OF MEDICAL CARE

In an address delivered at the 166th Annual Meeting of the Connecticut State Medical Society, April 30, Dr. Aims C. McGuinness, Special Assistant to the Secretary of the Department of Health, Education, and Welfare said:

"Since costs (of medical care) are increasingly important, we must constantly look for opportunities to reduce them without compromising the quality of care.

"The practicing physician can do something constructive about this every day by keeping such questions as these constantly in mind: (1) Is there a valid clinical basis for the laboratory or x-ray examination I am about to order?; (2) Is there a firm scientific basis for the therapy I am about to institute?; (3) Could less costly medication meet this patient's requirements?; (4) Does this patient's condition really merit hospitalization, or could he be handled about as well on an ambulatory basis?

"I should like to pursue in a bit more detail the whole question of hospitals and hospitalization. I cannot stress too strongly the need we have for increasing our efforts to keep people out of hospital beds; the need we have for making the most intelligent use of the plants we now have; and for our future hospitals, the need for a determined and imaginative approach to the design and operation of accommodations best suited to the patients to be served.

"It is old fashioned to think that every patient who enters a hospital must immediately put on pajamas and lie down in bed to be waited on. Many can and should be up and about for much of the day. The patient who doesn't have to be in bed is far better off, psychologically as well as physically, if he can walk around in his regular clothes and go to the dining room or cafeteria for his meals and to the lounge for radio or television or social contacts.

With good planning, many patients can get themselves to the laboratory and the x-ray department, thus obviating the necessity of providing costly escort service. This sort of thing accomplishes much in addition to helping the patient keep his mind off his troubles, and in addition to reducing the number of hours of personal services required by that patient."

### NURSE TRAINEESHIP CONFERENCE

A national conference to evaluate the Professional Nurse Traineeship Program will be held in Washington August 13-15 with

Dr. John Millett, President of Miami University as chairman.

About 80 recognized authorities from the fields of nursing education, medicine, hospital and public health nursing service, hospital administration, education and public health administration will participate in the conference.

MONOGRAPH AVAILABLE

*Characteristics and Professional Staff of Outpatient Psychiatric Clinics* is an 87 page monograph the purpose of which is "to provide statistical information to serve as a basis for program planning, and as a baseline for measuring trends in the number and kinds of outpatient psychiatric clinics and their professional staff."

Single copies of the monograph are available upon request to the Public Inquiries Branch, U. S. Public Health Service, Washington 25, D.C.

BOOKLETS AVAILABLE

*Health Statistics* from the U. S. National Health Survey. This is a preliminary report on the volume of physician visits in the United States (July-September 1957). This booklet has data concerning the frequency of visits to physicians, the distribution of the visits, time interval between visits with detailed tables. The 25-page booklet (PHS Publ. No. 584-B1) can be obtained from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D.C., for 25¢ (do not send stamps).

*The Extent of Cancer Illness in the United States* (PHS Publ. No 547) contains much information on the subject in the question and answer form. There are 22 figures and 9 tables to illustrate the answers in this 23-page booklet. The price for a single copy is 25¢ (no stamps) which can be obtained from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D.C.

HEALTH STATISTICS

A 22-page booklet, *Health Statistics, preliminary report on volume of Dental Care, United States, July-September 1957*, is available for 25¢ a copy from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D.C. Ask for PHS Publ. No. 584-B2.

## Veterans Administration

*Chief Medical Director*—WILLIAM S. MIDDLETON, M.D.
*Deputy Chief Med. Dir.*—R. A. WOLFORD, M.D.

APPOINTMENTS

Dr. Saul Fortunoff has been appointed as manager of the VA hospital at Dwight, Ill. He fills the position vacated by the retirement of Dr. Warren L. Fleck. During World War II Dr. Fortunoff was commander of the 650th Medical Clearing Company and the 181st Medical Battalion.

Dr. Blanton E. Russell, manager of the VA hospital at Cincinnati, Ohio, has been transferred to the VA hospital at Omaha, Nebraska, where he will be manager.

Dr. Raymond F. Smith, manager of the VA University Drive Hospital in Pittsburgh has been appointed to a similar position at the Cincinnati VA hospital.

Dr. Horace D. Smith, manager of the Omaha VA hospital, will succeed Dr. Raymond Smith at the VA University Drive Hospital, Pittsburgh.

STATISTICS

The veteran population in civil life at the end of March was estimated at 22,735,000.

The average daily patient load in hospitals was 116,742 (in VA hospitals 113,592; —in non-VA hospitals 3,150). For domiciliary care the average daily member load was 16,954. For outpatient care during the month of March there were 178,276 visits.

CONTRACTS FOR MEDICAL CARE

Beginning July 1 the Veterans Administration proposes to replace formal contracts with state medical associations for its hometown medical program by informally negoti-

ated agreements with those associations. This new program will afford veterans with service-connected disabilities free choice of physicians in areas where VA medical facilities are not available.

Dr. A. J. Klippen, Director of Clinics, said the new proposal will apply in these states where contracts expire on June 30, 1958: Arkansas, Connecticut, Delaware, Florida, Georgia, Idaho, Illinois, Indiana, Kentucky, Maine, Massachusetts, Missouri, Nevada, New Hampshire, New Jersey, North Dakota, Ohio, Pennsylvania, South Carolina, Tennessee, Vermont, Virginia, West Virginia, and Wyoming, plus New York which operates under a special type of agreement.

## Miscellaneous

POLIO VACCINE

Children as young as two or three months should have their first shot of Salk polio vaccine which can be given at the same time as protection against whooping cough. So stated Dr. Thomas M. Rivers, Medical Director of the National Foundation for Infantile Paralysis.

The fourth injection of Salk vaccine has not been recommended because of the high effectiveness of the present schedule of three inoculations.

After three injections the effectiveness of the vaccine has been approximately 90 per cent. So continue to VACCINATE FOR POLIO—three injections.

OUT IN SPACE

Reports from instruments in the Army-launched Explorer satellites state that the cosmic ray count sometimes ran more than 35,000 per second at the highest altitudes. Dr. James Van Allen, of the State University of Iowa, said, "This could mean that it would not be safe for a human being to remain more than 1,000 miles out in space for more than five hours, unless he could be adequately shielded."

The temperature inside Explorer I was recorded between 32 and 104 degrees Fahrenheit. It was also found that at a height of 234 miles the atmosphere had a density of two ounces per cubic mile which is higher than formerly estimated.

DEFENSE

In the atomic age the Infantryman is still the symbol of our nation's strength. He has not been replaced by anything that razes, radiates, flies, floats, buzzes, booms or bangs. Wherever he stands around the globe, with his rifle in hand and his feet planted firmly on the ground, he is visible evidence to any leader of Communist conspiracy that we mean exactly what we say—that we intend to resist aggression in any form.—Maj. Gen. Herbert B. Powell, "The Infantry Man in the Atomic Age,"—Army Information Digest, April '58.

EDUCATIONAL PROGRAM

Resident physicians and interns will profit from a continuing Audio-Education Program sponsored for them in the 200 one-year subscriptions to "Audio-Digest" by the Schering Corporation.

This service consists of tape recordings of important medical articles, clinical reviews and lectures for teaching hospitals in the United States.

GRAND ROUNDS

A closed television program originating from San Francisco during the American Medical Association's Convention may be viewed in eight cities on June 25 (6-7:30 p.m. Pacific daylight-saving time).

The eight cities are: Boston, Chicago, Cleveland, Kalamazoo, Michigan; New York, Philadelphia, San Francisco, and Syracuse, New York.

The program will be placed on 16 mm. motion picture film for subsequent presentation to medical societies and other professional medical groups. The Upjohn Company, Kalamazoo, Michigan may be contacted for further information.

PHARMACY BOOKLET AVAILABLE

*Facts About Pharmacy and Pharmaceuticals* is a 137-page book that is filled with information about the pharmaceutical industry, production of drugs, pharmaceutical associations, pharmaceutical journals, etc. Anyone interested in pharmacy in any of its facets should have this book. The price is $1.25 per copy and can be obtained from the Health News Institute, 60 East 42nd St., New York 17, N.Y.

MEDICAL REVIEWS

Volume 3 of *Bibliography of Medical Reviews* is now ready for distribution. This contains approximately 600 non-*Current List* articles along with the 2300 review articles also listed in *Current List of Medical Literature*. Copies may be obtained from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D.C. at $1.25 (money order or check—no stamps).

INTERNATIONAL CLASSIFICATION OF DISEASES

*Manual of the International Statistical Classification of Diseases, Injuries, and Causes of Death.* Vol. I. (two vols.) World Health Organization. (Available in English, French and Spanish.) 393 pages, and xli introduction. Can be obtained through Columbia University Press, IDS, New York. 1957. Price $6.75 for 2 vols. (not sold separately).

This is the first volume of the new edition of this manual; the second volume, the alphabetical index, will be published within the next few months.

The International Statistical Institute adopted the first International List of Causes of Death in 1893. The list has been revised about every ten years. In 1946 the World Health Organization took over the work as it represents the field of public health for the world.

No alterations to the actual structure of the classification have been made by this revision. The main modifications are essentially intended to improve the existing provisions.

MEDICAL RECORD LIBRARIANS MEETING

The 30th annual meeting of the American Association of Medical Record Librarians will be held in Boston, Mass., at the Statler Hotel, October 13-16, 1958.

POSTGRADUATE EDUCATION

The Second Oklahoma Colloquy on Advances in Medicine will be held in Oklahoma City, Okla., November 12-15 and will be devoted to Arthritis and Related Disorders. This is under the joint sponsorship of the Department of Medicine, University of Oklahoma, the Division of Postgraduate Education, Geigy Pharmaceuticals, Wyeth Laboratories, The Upjohn Company, Pfizer Laboratories, and Schering Corporation. Twelve nationally prominent investigators in their field will participate and present the results of original work from their laboratories.

Registrations will be open to all physicians. Further information may be obtained by writing to the Division of Postgraduate Education, University of Oklahoma School of Medicine, Oklahoma City, Okla.

CIVILIAN PHYSICIANS NEEDED

Positions for civilian physicians are open at Fort Myer, Va., and Fort Belvoir, Va. Fort Myer needs a pediatrician, an internal medicine specialist and a general practitioner. Dewitt Army Hospital at Fort Belvoir needs three general practitioners and one pediatrician. Applicants must be registered in one of the 48 states.

Interested physicians should apply to the Civilian Personnel Office at the above stations.

RADIO PAGING

In a number of military installations paging key personnel is now done through the means of an individual pocket radio

worn by the doctor, nurse, or other key person.

The person wanted receives a signal on his individual radio and the voice follows giving the message; others are not disturbed. This new system will eliminate the call system by bell or voice and the light system now used in many hospitals for paging personnel.

DRUG FOR LEPROSY

A new drug, diphenyl thiourea, has undergone tests in the treatment of leprosy and appears to be of considerable value. This was reported in *Leprosy Review* recently. Ciba is the manufacturer of this drug.

CLEANING BY SOUND WAVES

Ultrasonic washing machines for hospitals may some day take the place of the hand brush in the cleaning of surgical instruments. In a recent test 75 soiled surgical instruments were cleaned in 13 minutes by the ultrasonic method as opposed to the hand brush method which took 45 minutes.

INJURED NOSE

Into the tax office came a man who had, within the week, been in a small motor accident. Adhesive tapé was across the bridge of his nose. He drew out a wad of notes and passed them across the collector's counter

"Had an accident to your nose?" asked the collector. "No," said the tax-weary citizen, "I've been paying through the nose so long it's given way under the strain."—*Illustrated Weekly of India,* Bombay.

POLITICIANS NOTE

By the 1960 election there will be 3.25 million more women voters than men voters. —*Horizons,* syndicated by Cambridge Assoc., Boston.

## PROPOSED CHANGE IN CONSTITUTION

The Executive Council of the Association of Military Surgeons of the United States proposes the following change to Article IV, Section 2, paragraph 2 of the Constitution of the Association pertaining to the election and holding of office:

PRESENT READING: "These officers shall hold office until their successors are elected and accept office."

PROPOSED READING: "The officers shall be elected yearly at the Annual Convention of the Association and their term of office shall be during the calendar year immediately succeeding that in which their election takes place. In any case in which successors are not elected to office the incumbents shall hold office until their successors are elected and accept office."

DISCUSSION: Since the affairs of the office of president of the Association cannot be cleared up for sometime after the annual meeting it is advisable to continue the tenure of office for the remainder of the calendar year in which the meeting is held. The necessity for changing dates of the convention from year to year also makes the term of officers irregular; the calendar year term would make the term of office more certain to all members.

# OBITUARIES

## Col. Harold W. Jones, U. S. Army, Ret.

Harold Wellington Jones, Colonel, Medical Corps, U. S. Army, Retired, died suddenly at his home in Orlando, Florida, April 5 at the age of 80.

Colonel Jones was born in Cambridge, Mass., November 5, 1877. After attending Massachusetts Institute of Technology, he entered Harvard University Medical School where he received his medical degree in 1901. After an internship and residency in the Children's Hospital, Boston, he practiced in St. Louis, Mo., for a period of two years. He entered the Army Medical School in September 1905, graduated as an honor student in June 1906, and was then commissioned in the Medical Corps. Then began almost 40 years of active duty, uninterrupted by his retirement for age in 1941, until April 1946.

His assignments varied from that with a small command operating in Samar and Leyte against native hostile groups, and in command of an ambulance train with Pershing in Mexico in 1916 to that as commanding officer of the large Beau Desert Hospital Center (5 miles from Bordeaux) with over 12,500 patients during World War I. His great opportunity came when he was assigned to the Army Medical Library (now the National Library of Medicine) in 1936. He brought to this assignment wide experience and knowledge gained from his varied assignments and extensive travel in Europe and the Far East. He was responsible for the "new look" and it was through his efforts that the Rockefeller Foundation granted funds for a detailed study of the Library by the Medical Library Association.

Colonel Jones arranged with the Cleveland Medical Library for suitable space for the Army Medical Library's valuable historical collection including the irreplaceable incunabula, of which the Library holds such a large percentage of all in existence. This was a most important service and the transfer of this priceless collection to Cleveland insured the preservation of it.

His writings were varied and on many subjects. He was author of "Green Fields and Golden Apples" published in 1942. This is most rewarding reading. He received many honors among which were: Honorary Curator, Osler Library, Montreal, 1936-46; President, Medical Library Association, 1940-41; Honorary Doctor of Laws degree, Western Reserve University, 1945. He was Secretary of the 10th International Congress of Military Medicine, Washington, 1939. He was twice decorated by France (1918 and 1937) by Romania, 1941, by Poland, 1939, by Mexico, and by the United States, 1945 (Legion of Merit).

After his return to inactive duty in April 1946, he edited the New Gould Medical Dictionary. Upon completion of this work, he became Chief Editor of the Medical Section of the Encyclopedia Americana, and continued in this work for several years.

He is survived by his widow, Mrs. Mary W. Jones, 1303 Chicester Ave., Orlando, Fla., a daughter, two sisters and a stepson.

Interment was at Arlington National Cemetery.

## Cdr. Harvey A. Kelly, MC, USNR, Ret.

Harvey A. Kelly, Medical Corps, U. S. Navy Reserve, Retired, died on April 8 of a heart condition at Phillips House of Massachusetts General Hospital at the age of 75.

Doctor Kelly, a native of East Boston, graduated from the University of Maryland

School of Medicine in 1906. For forty years he served as a port physician representing many foreign countries in the Port of Boston. In 1954 following a leg amputation he engaged in a limited practice as he desired to remain active. In that year he was named Massachusetts "Doctor of the Year."

He was founder of the Winthrop Community Hospital and served as its executive chairman for 18 years and president of its medical staff for five years. He was past president of the Massachusetts Academy of General Practice, and a former vice-president of the Massachusetts Medical Society. He served on the editorial board of the New England Journal of Medicine, and more than twenty years as a councilor of the Massachusetts Medical Society.

A veteran of World War I, he served as a commander in the Navy Medical Corps during World War II.

He is survived by his wife who resides at 200 Pleasant Street, Winthrop, Mass.; a son, and four grandchildren.

## Capt. Isaac B. Polak, U. S. Navy, Ret.

Isaac B. Polak, Medical Corps, U. S. Navy, Retired, died at his home in San Diego, California, on April 24 at the age of 63.

He was a native of Biddleford, Maine. He received his medical degree from Tufts College Medical School in 1918, and while serving his internship at Waltham Hospital, Waltham, Mass., he was commissioned a Lieutenant, junior grade, in the Medical Corps Naval Reserve Force. After completing his internship he reported for active duty and in 1922 transferred to the Regular Navy. On January 1, 1955 he was placed on the retired list of Naval officers. During World War II he commanded Naval Base Hospital No. 8.

He is survived by his wife who resides at 2225 Pine St., San Diego, Calif.; and a daughter.

Interment was at Fort Rosecrans National Cemetery, San Diego.

# BOOK REVIEWS

SURGERY—PRINCIPLES AND PRACTICE. Edited by J. Garrott Allen, M.D., Professor of Surgery, University of Chicago; Henry N. Harkins, M.D., Professor of Surgery, University of Washington School of Medicine; Carl A. Moyer, M.D., Bixby Professor of Surgery, Washington University School of Medicine; and Jonathan E. Rhoads, M.D., Professor of Surgery, University of Pennsylvania School of Medicine. 1495 pages, 623 illustrations. J. B. Lippincott Company, Philadelphia and Montreal. 1957. Price $16.00.

This is an excellent book containing in one volume a most up-to-date presentation of the best in surgery. This unexcelled text book deserves wide recognition. Its readers may well embrace medical students, specialists, and all who deal with patients having conditions requiring surgical consideration. The strong emphasis based on the basic material in physiology, anatomy, biochemistry, and pathology is equalled by the understanding the authors and contributors have placed on the art of medicine.

The book is a totally magnificent contribution which should go through many editions.

BRIG. GEN. JAMES H. FORSEE, MC, USA

CLINICAL PATHOLOGY IN GENERAL PRACTICE. Specially Commissioned Articles from the British Medical Journal. 312 pages. J. B. Lippincott Company, Philadelphia and Montreal. 1957.

The book consists of six major sections, the first of which gives *Practical Technics* many of which I wish I had known during my first years of practice. Subjects such as the taking of swabs, venipuncture and lumbar puncture, biopsies and the control of legal samples, as well as a brief outline of autopsy procedure are included.

The next section describes tests of *Renal and Alimentary Function* and outlines some of the simple, most commonly used procedures. *Infections* covers material on serological tests and other related subjects involving the handling of infectious material. *Hematology* gives a good background discussion of normal blood, various anemias, blood grouping, etc. *Metabolic and Endocrine Disorders* describes the laboratory values obtained in altered pituitary thyroid and gonadal function, among other topics.

*Special Topics* includes a discussion of laboratory applications to skin diseases, tropical disease and industrial toxicology.

Two lead articles describe the laboratory services available under the Public Health Service and the National Health Service in the British Isles.

LT. J. H. BOUTWELL, JR., MC, USNR

J.A.M.A. CLINICAL ABSTRACTS OF DIAGNOSIS AND TREATMENT. Published with the Approval of the Board of Trustees, American Medical Association. Selected by I. Phillips Frohman, M.D. 564 pages. Intercontinental Medical Book Corp., with Grune & Stratton, Inc., New York and London. 1957. Price $5.50.

"Medical Literature Abstracts" of the Journal of the American Medical Association represent many man hours of labor in reading hundreds of medical journals and abstracting articles. These abstracts are published in the weekly issues of the Journal.

Here in this book Dr. Frohman has grouped selected abstracts under the body systems and several miscellaneous titles. The index enables one to find quickly the abstract pertaining to the subject of interest.

R. E. B.

ONE SURGEON'S PRACTICE. By Frederick Christopher, M.D., Emeritus Professor of Surgery, Northwestern University Medical School. 151 pages. W. B. Saunders Company, Philadelphia and London. 1957. Price $4.00.

Dr. Christopher, a prominent surgeon, a contributor to medical literature, an author of a well known textbook on surgery, has related in this little book some of his experiences in a busy practice.

In 14 chapters he covers the lifetime of a surgeon under such headings as "The Patient Meets the Surgeon," "The Surgeon in the Operating Room," "Surgical Pitfalls," "Non-Professional Activities." There are other chapters just as interesting as these. The epilogue, references, and an index complete the book.

While this is a book pitched to the young surgeon, every physician will find much information for him regardless of his particular field in medicine. The senior medical student should read this, too, whether he plans to qualify for surgery or not.

In this book an experienced surgeon gives sound advice for physicians and medical students.

COL. R. E. BITNER, USA, RET.

# MILITARY MEDICINE

ICIAL JOURNAL
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## Washington, D.C.

VOL. 122 JUNE 1958 NO. 6

65TH ANNUAL CONVENTION, STATLER HILTON,
WASHINGTON, D.C., NOVEMBER 17-19, 1958

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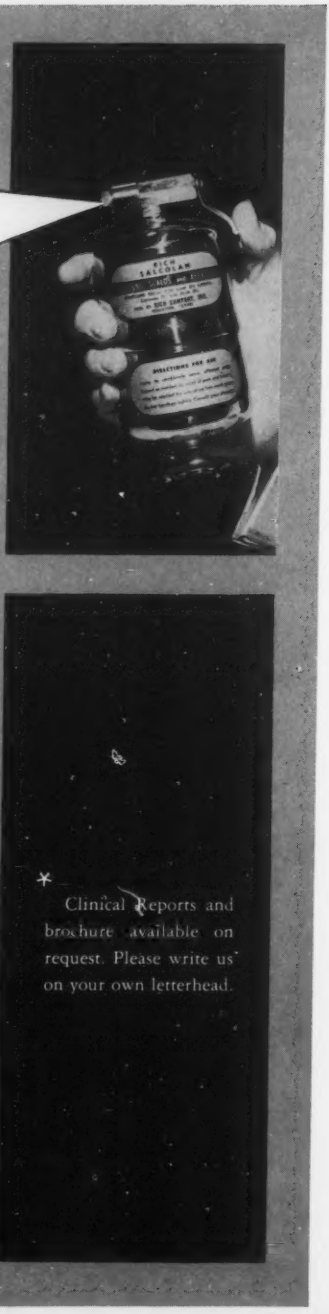

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VOL. 122 June, 1958 NO. 6

# MILITARY MEDICINE

(*Formerly* THE MILITARY SURGEON)

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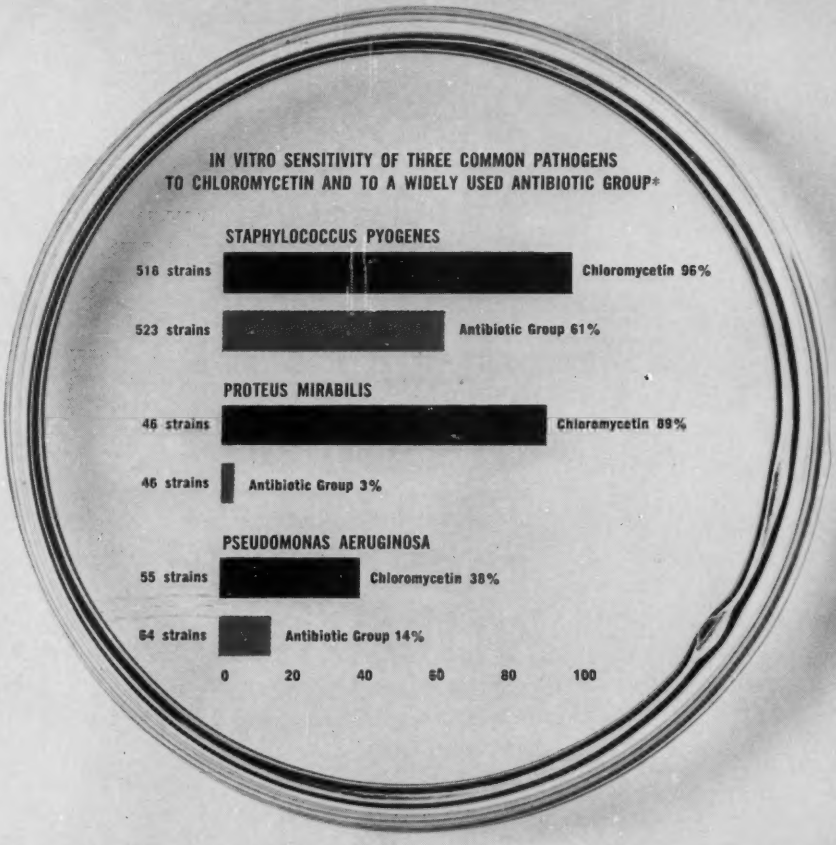


*Adapted from Roy, T. E.; Collins, A. M.; Craig, G., & Duncan, I. B. R.: *Canad. M. A. J.* 77:844 (Nov. 1) 1957.

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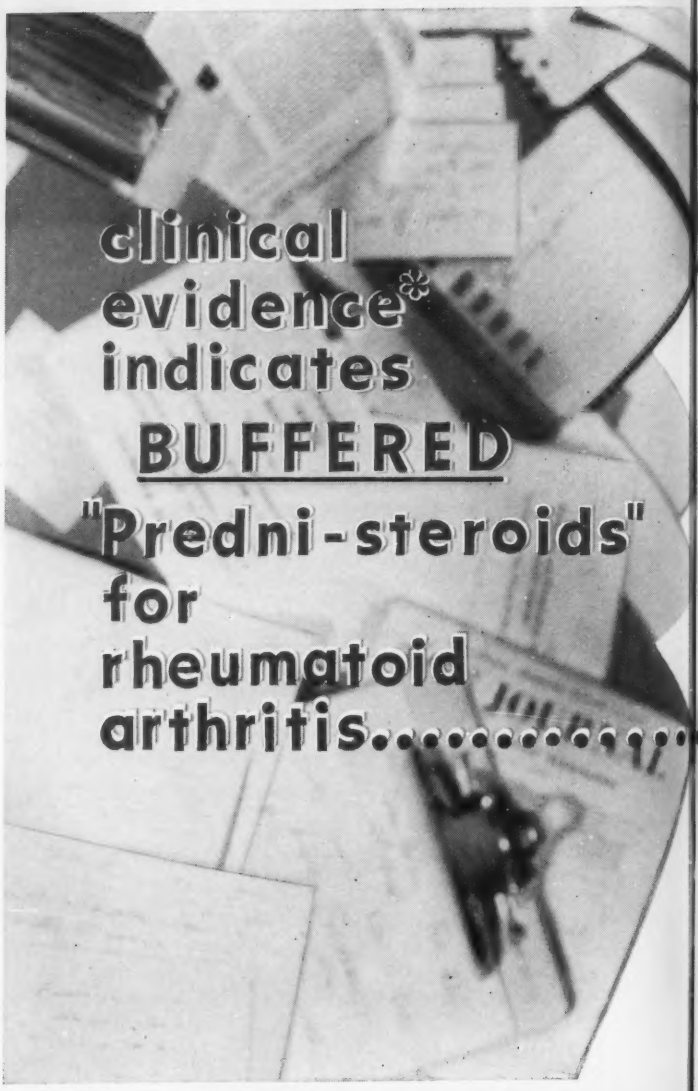
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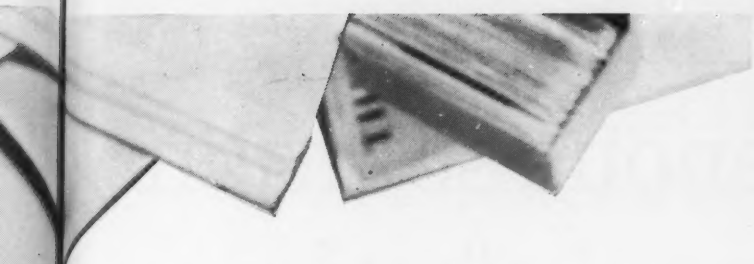

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*"The apparent high incidence of this serious [gastric] side effect in patients receiving prednisone or prednisolone suggests the advisability of routine co-administration of an aluminum hydroxide gel."—Bollet, A. J. and Bunim, J. J.: J. A. M. A. 158:459 (June 11) 1955.

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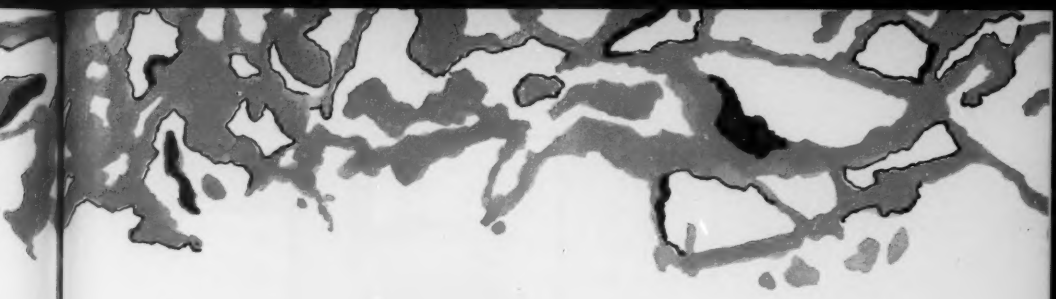
Each Tablet Contains: 10,000 Units Streptokinase and 2,500 Units Streptodornase

Dosage: One tablet four times daily for a minimum of three days



PROCESS OF FIBRINOLYSIS

# BUCCAL TABLETS

CONTROLS INFLAMMATION—REDUCES SWELLING—RELIEVES ASSOCIATED PAIN.

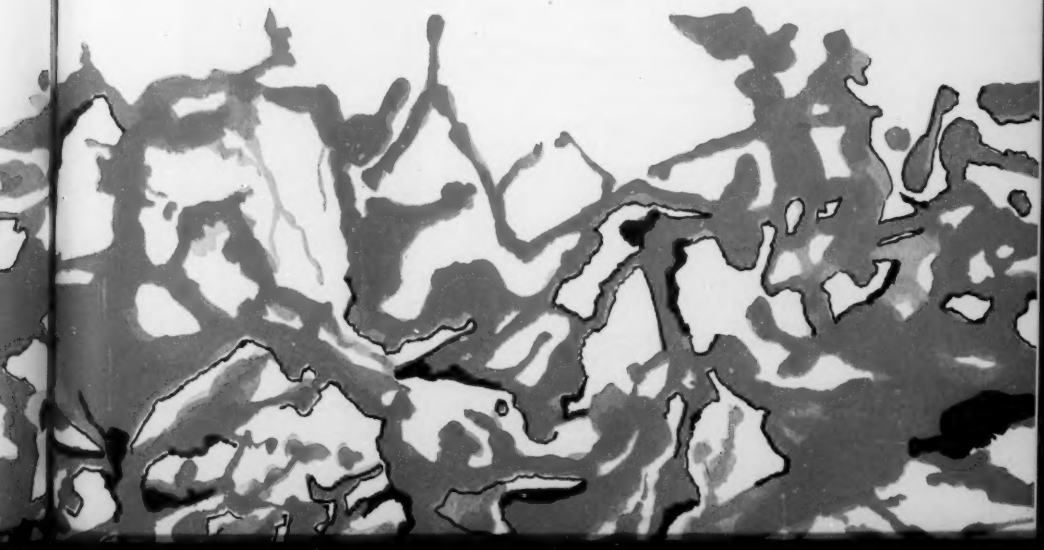
For the management of edema associated with TRAUMA and INFECTION

- CELLULITIS
- ABSCESSES
- HEMATOMA
- THROMBOPHLEBITIS
- SINUSITIS
- UVEITIS
- CHRONIC BRONCHITIS
- LEG ULCERS
- CHRONIC BRONCHIECTASIS

LEDERLE LABORATORIES DIVISION, AMERICAN CYANAMID COMPANY, PEARL RIVER, NEW YORK

*Reg. U.S. Pat. Off.

Lederle




**Representative Case Report:**

*Mrs. N.F., aged 43—panhysterectomy*

Anxiety, insomnia, and emotional instability complicating preparation for surgery. For psychic support, EQUANIL therapy was started ten days before operation. The tension symptoms diminished, and the patient became cooperative. Postoperatively, the drug was continued, maintaining the patient's emotional equilibrium and thereby accelerating convalescence.

## surgery is a time of stress

**EQUANIL**
Meprobamate
**PHENERGAN® HCl**
Promethazine HCl
**SPARINE® HCl**
Promazine HCl

*A Wyeth normotropic drug for nearly every patient under stress*

Wyeth
Philadelphia 1, Pa.

Equanil®
**Meprobamate**

***Relieves tension—mental and muscular***

**a new, modified corticosteroid molecule with greater antiallergic, antirheumatic and anti-inflammatory activity**

*for your patients with*

- BRONCHIAL ASTHMA, ALLERGIC DISORDERS
- ARTHRITIC DISORDERS
- DERMATOSES

**Squibb Triamcinolone**

# KENACORT

- far less gastro-intestinal distress
- safe to use in asthma with associated cardiac disease; no sodium and water retention
- does not produce secondary hypertension—low salt diet not necessary
- no unnatural psychic stimulation
- often works when other glucocorticoids have failed
- and on a lower daily dosage range

SQUIBB

**Initial dosage:** 8 to 20 mg. daily. After 2 to 7 days gradually reduce to maintenance levels. See package insert for specific dosages and precautions.

1 mg. tablets, bottles of 50 and 500.
4 mg. tablets, bottles of 30 and 100.

CENTENNIAL 1858 1958 SQUIBB

**Squibb Quality—the Priceless Ingredient**

# premenstrual

# 'DIURIL'

(CHLOROTHIAZIDE)

FORD, R. V., Rochelle, J.B.III, Handley, C. A., Moyer, J. H. and Spurr, C. L.: J.A.M.A. **166**:129, Jan. 11, 1958.

". . . in premenstrual edema, convenience of therapy points to the selection of chlorothiazide, since it is both potent and free from adverse electrolyte actions." In the vast majority of patients, 'DIURIL' relieves or prevents the fluid "build-up" of the premenstrual syndrome. The onset of relief often occurs within two hours following convenient, oral, once-a-day dosage. 'DIURIL' is well tolerated, does not interfere with hormonal balance and is continuously effective—even on continued daily administration.

DOSAGE: one 500 mg. tablet 'DIURIL' daily—beginning the first morning of symptoms and continuing until after onset of menses. For optimal therapy, dosage schedule should be adjusted to meet the needs of the individual patient.

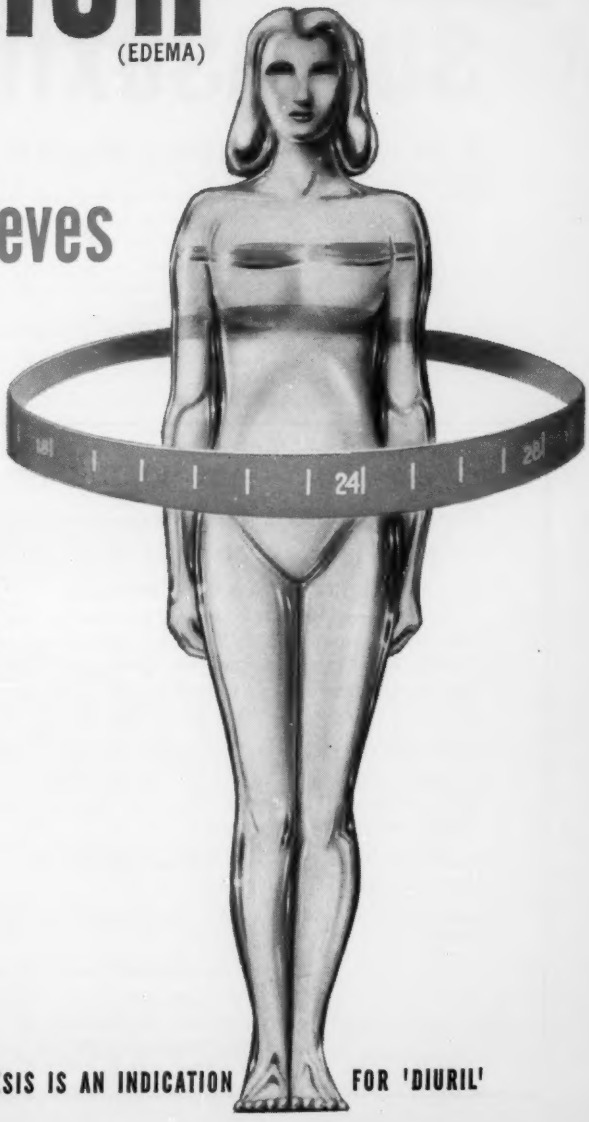
SUPPLIED: 250 mg. and 500 mg. scored tablets 'DIURIL' (chlorothiazide); bottles of 100 and 1,000.

DIURIL is a trade-mark of Merck & Co., Inc.

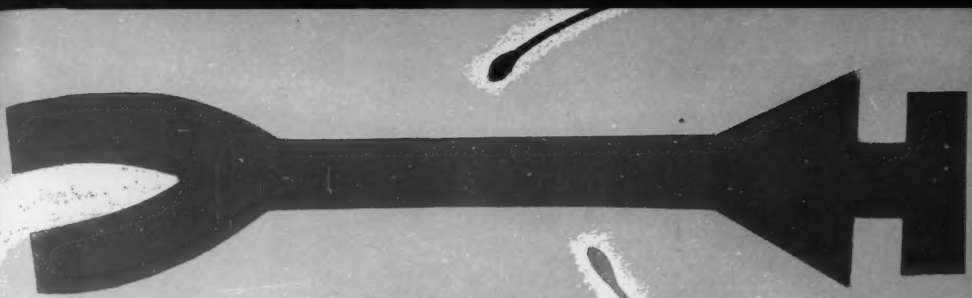
MERCK SHARP & DOHME Division of MERCK & CO., INC., Philadelphia 1, Pa. MSD

# tension
(EDEMA)

quickly relieves
Distress
Distention
Discomfort




ANY INDICATION FOR DIURESIS IS AN INDICATION FOR 'DIURIL'



# Ortho's

## most spermicidal contraceptive

## for

## your most fastidious patients

# Delfen®

Trademark

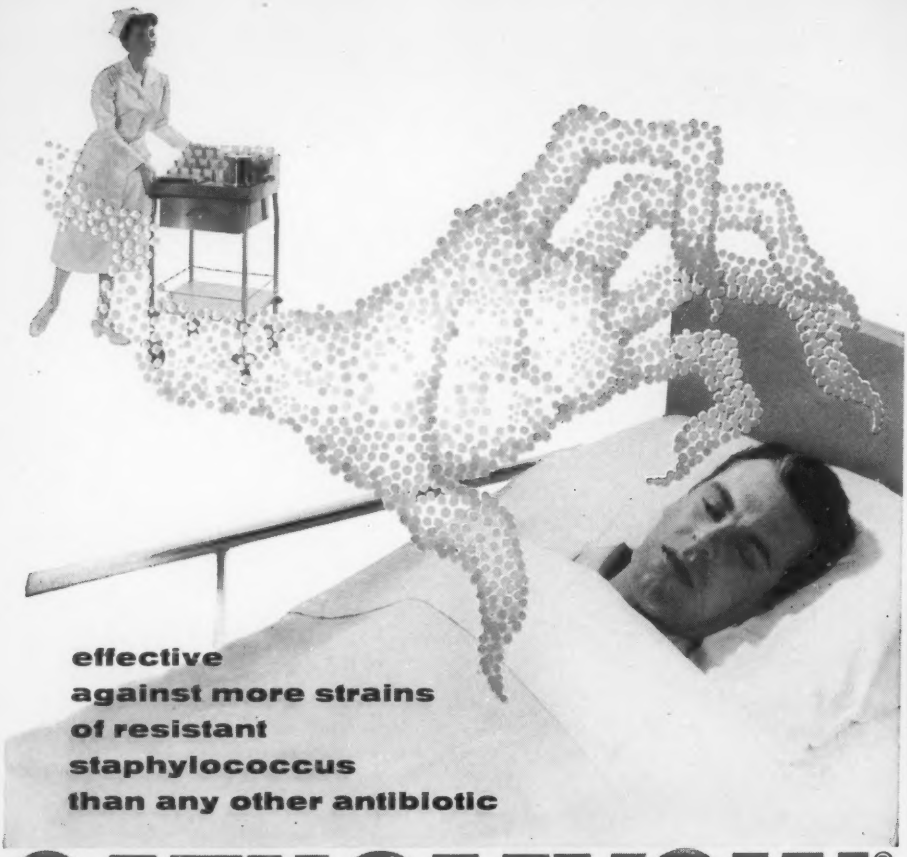
VAGINAL CREAM

"...is highly spermicidal....Its relative simplicity makes it very acceptable to the patient."*

*Behne, D.; Clark, F.; Jennings, M.; Pollais, V.; Olson, H.; Wolf, L., and Tyler, E. T.: West. J. Surg. 64:152, 1956.

Composition: Nonylphenoxypolyethoxyethanol 5% in an oil-in-water emulsion at pH 4.5.

Ortho



**effective against more strains of resistant staphylococcus than any other antibiotic**

# CATHOMYCIN®

NOVOBIOCIN

98.6 per cent effective[1] against micrococcus aureus — including resistant strains — isolated from hospitalized patients. "The striking sensitivity of 200 strains (of hemolytic staphylococci) to novobiocin deserves emphasis."[2]

"...novobiocin was uniformly bacteriostatic in concentrations of 1 μg. per milliliter and 50% of the strains were killed by concentrations of 20 μg. per milliliter."[2]

SUPPLIED: Capsules CATHOMYCIN (sodium novobiocin), 250 mg. of novobiocin per capsule, bottles of 16 and 100. Syrup CATHOMYCIN (calcium novobiocin), each 5 cc. contains 125 mg. novobiocin, bottles of 60 cc. and 1 pint.

1. Pulaski, E. J., and Isokane, R. K.: Surg., Gynec. & Obst., 104:310, March 1957.
2. Petersdorf, R. G., Curtin, J. A., and Bennett, I. L.: Arch. Int. Med. 100:927, December 1957.

CATHOMYCIN is a trade-mark of Merck & Co., Inc.

MERCK SHARP & DOHME Division of MERCK & CO., INC., Philadelphia 1, Pa. MSD

## Most effective when used preoperatively

# Adrenosem®*

SALICYLATE

(Brand of carbazochrome salicylate)

## to control oozing and bleeding

As one clinician states: "Blood loss may be hidden temporarily after closure of the thoracic or abdominal cavities, even though drains are in place. Obstruction to outflow through these drains can occur, and bleeding is not apparent.

"There are certain clinical situations in which prolonged and profound oozing of blood may occur."[1]

Published reports[2-6] over the last five years emphasize the value of Adrenosem preoperatively—to control oozing and bleeding and provide a clearer operative field.

Adrenosem does not affect blood pressure, cardiac rate or output, blood clotting mechanism, massive hemorrhage, or arterial bleeding.[7]

*Supplied in ampuls, tablets and as a syrup.*

*U.S. Pat. 2581850, 2506291

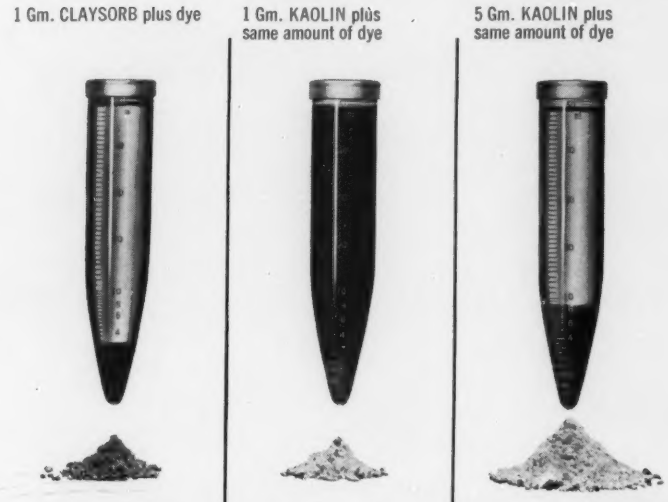
**THE S. E. MASSENGILL COMPANY**

BRISTOL, TENNESSEE • NEW YORK • KANSAS CITY • SAN FRANCISCO

***For bacterial diarrheas—new effectiveness . . .***

## 1. Powerful new adsorbent . . .
## *five times as adsorbent as kaolin*

Proof of adsorptive superiority



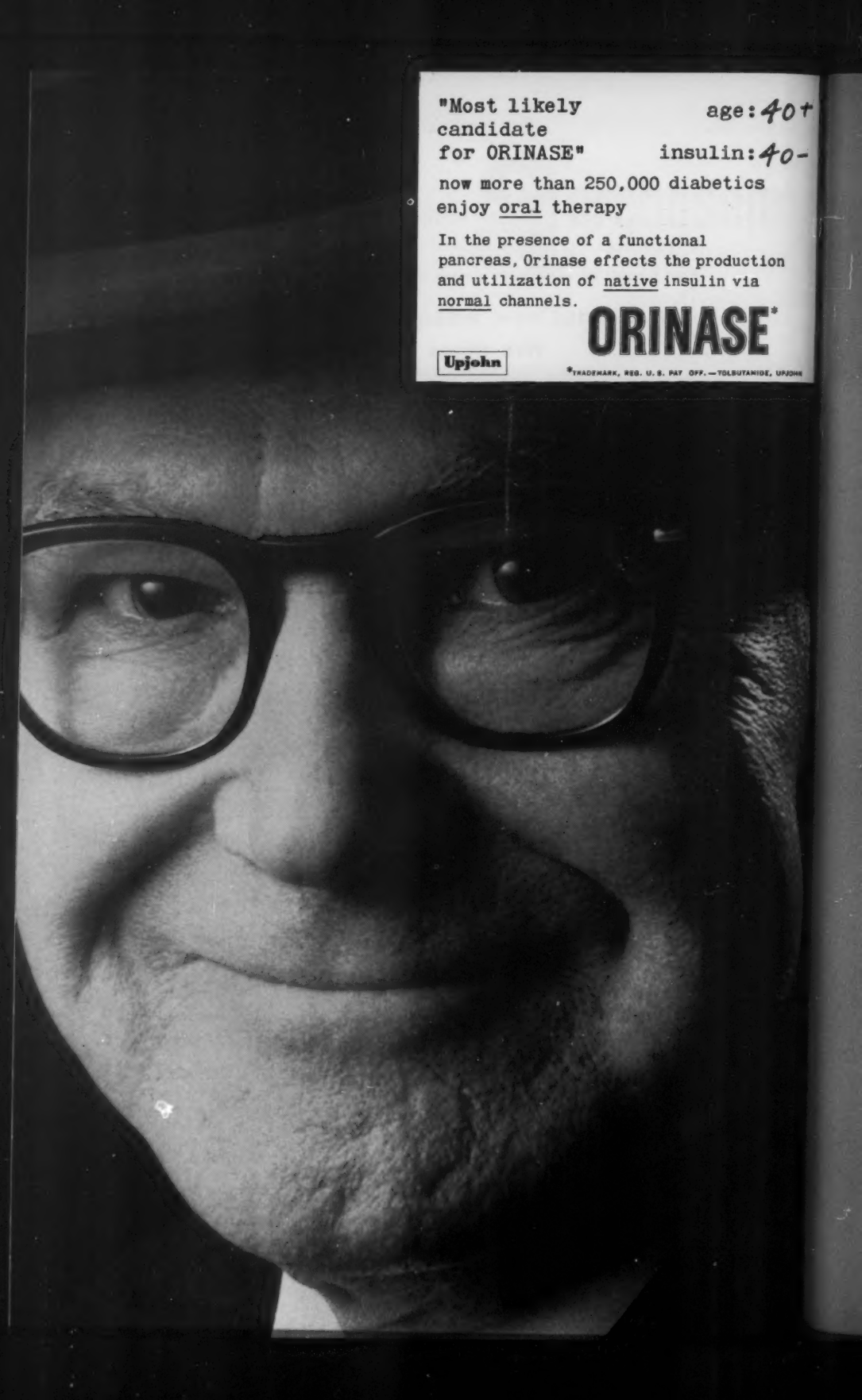

Supplied: Bottles of 8 fl. oz

# Polymagma®

Dihydrostreptomycin Sulfate, Polymyxin B Sulfate, and Pectin with Clay-sorb* (Activated Attapulgite, Wyeth) in Alumina Gel, Wyeth

Wyeth®
Philadelphia 1, Pa.
**Trademark*

- POWERFUL NEW ADSORBENT
- SYNERGISTIC ANTIBIOTICS
- LOW DOSE
- PLEASANT TASTE
- WELL-TOLERATED

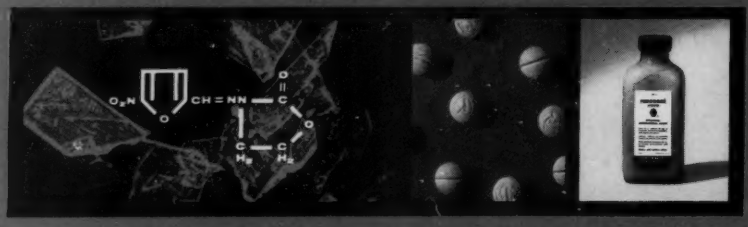

"Most likely candidate for ORINASE"
age: 40+
insulin: 40-
now more than 250,000 diabetics enjoy oral therapy
In the presence of a functional pancreas, Orinase effects the production and utilization of native insulin via normal channels.
ORINASE*
Upjohn
*TRADEMARK, REG. U. S. PAT. OFF. — TOLBUTAMIDE, UPJOHN

*new...* wide-range nitrofuran controls the "problem pathogens" of

*bacterial diarrheas and enteritis*

# FUROXONE®

brand of furazolidone



## FUROXONE LIQUID

A finely divided suspension containing Furoxone, 50 mg. per 15 cc., with kaolin and pectin for added demulcent and adsorptive effect ■ Pleasant orange-mint flavor ■ For patients of all ages (may be mixed with infant formulas; passes through a standard nursing nipple)

■ Supplied in bottles of 240 cc.

## FUROXONE TABLETS

Scored brown tablets containing Furoxone, 100 mg.

■ Supplied in bottles of 20 and 100 tablets.

■ **Perorally effective against a wide range of enteric bacteria[1,2]—including common pathogenic species and strains of Escherichia, Salmonella and Staphylococcus not adequately controlled by antibiotics and sulfonamides.** ■ **Bactericidal rather than bacteriostatic.**

■ **Does not induce development of significant bacterial resistance, nor predispose to monilial or staphylococcal overgrowth.**

■ **No toxicity reported.[1]**

■ **Side effects infrequent. Mild sensitization (rash), nausea or emesis may occur occasionally.**

1. Ponce de Leon, E.: Antibiotic Med. & Clin. Therapy 4:816, 1957.

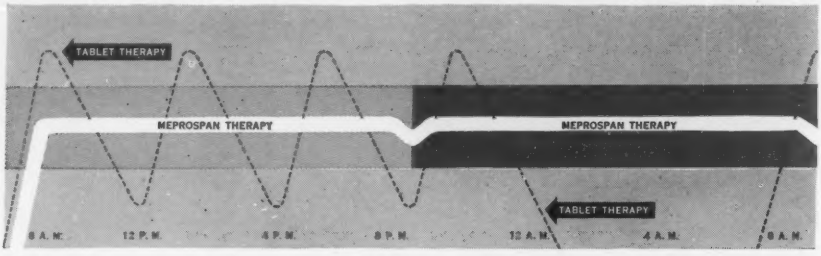
2. McFadden, H. W. and Musselman, M. M.: Personal communication to Eaton Laboratories.

NITROFURANS—A unique class of antimicrobials Products of Eaton Research

Eaton Laboratories, Norwich, New York

# New... meprobamate prolonged release capsules

## Evenly sustain relaxation of mind and muscle 'round the clock




TWO MEPROSPAN CAPSULES IN THE MORNING relieve anxiety, tension and skeletal muscle spasm throughout the day.

TWO MEPROSPAN CAPSULES AT BEDTIME provide uninterrupted sleep throughout the night.

# Meprospan*

MEPROBAMATE IN **PROLONGED RELEASE** CAPSULES

- maintains constant level of relaxation
- minimizes the possibility of side effects
- simplifies patient's dosage schedule

**Dosage:** Two Meprospan capsules q. 12 h.
**Supplied:** Bottles of 30 capsules.
*Each capsule contains:*
Meprobamate (Wallace) .....200 mg.
2-methyl-2-n-propyl-1,3-propanediol dicarbamate

***Literature and samples on request.***

*TRADE-MARK CME-6099-48

WALLACE LABORATORIES, *New Brunswick, N. J.*

for the hospitalized tuberculous patient

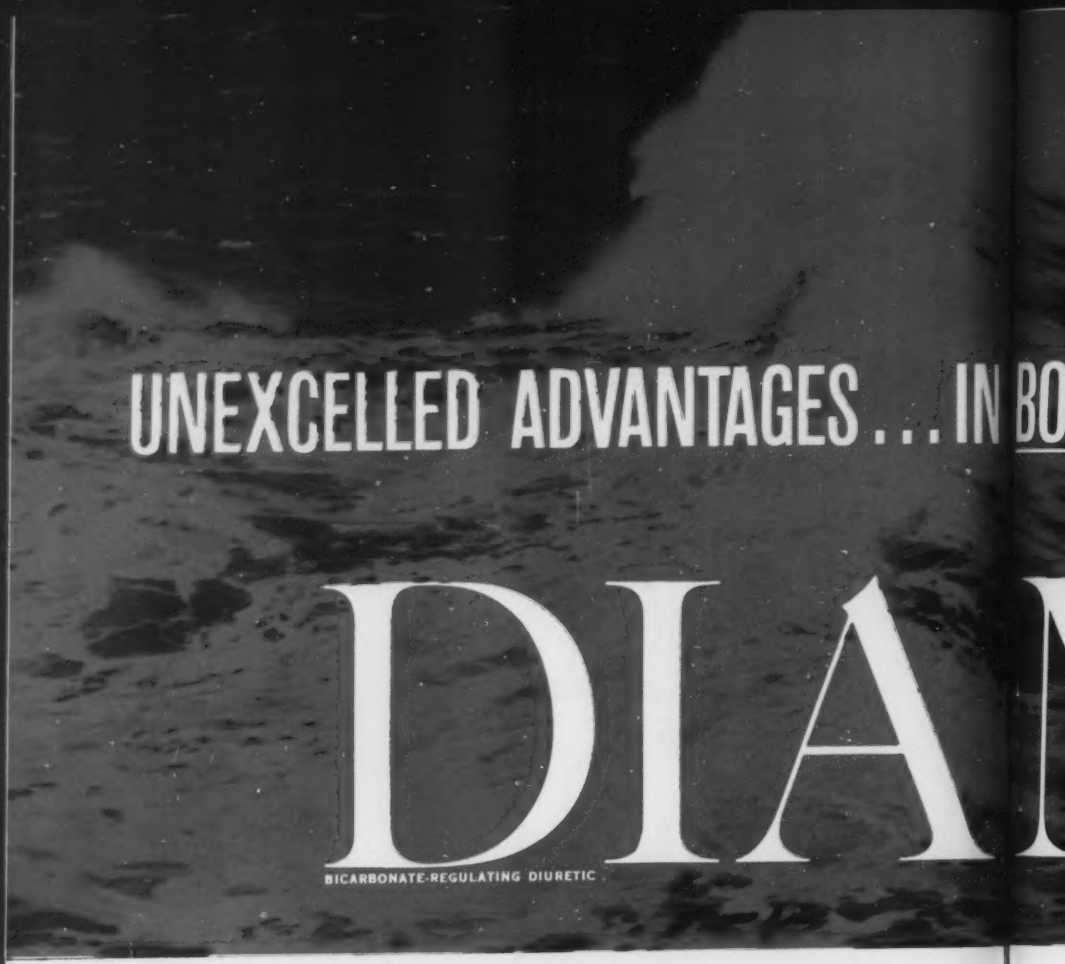
# PYRAZINAMIDE

PYRAZINOIC ACID AMIDE

- *For the patient before surgery:* dramatic, potentially lifesaving tuberculostasis, to protect against spread of infection.
- *For extrapulmonary lesions:* draining sinuses, mucosal lesions, and lymphadenopathy—remarkable, rapid improvement or healing.
- *For relatively far-advanced fibrotic lesions:* partial clearing—in a larger percentage when acute, infiltrative—in a smaller percentage when chronic.

When the patient fails to respond to other chemotherapy: much short-term improvement. Fever, cough, and quantity of sputum are reduced and the patient gains weight, enjoys increased appetite and a sense of well-being. The antituberculotic effect is enhanced when combined with other drugs.

MSD **MERCK SHARP & DOHME**
DIVISION OF MERCK & CO., INC., PHILADELPHIA 1, PA.

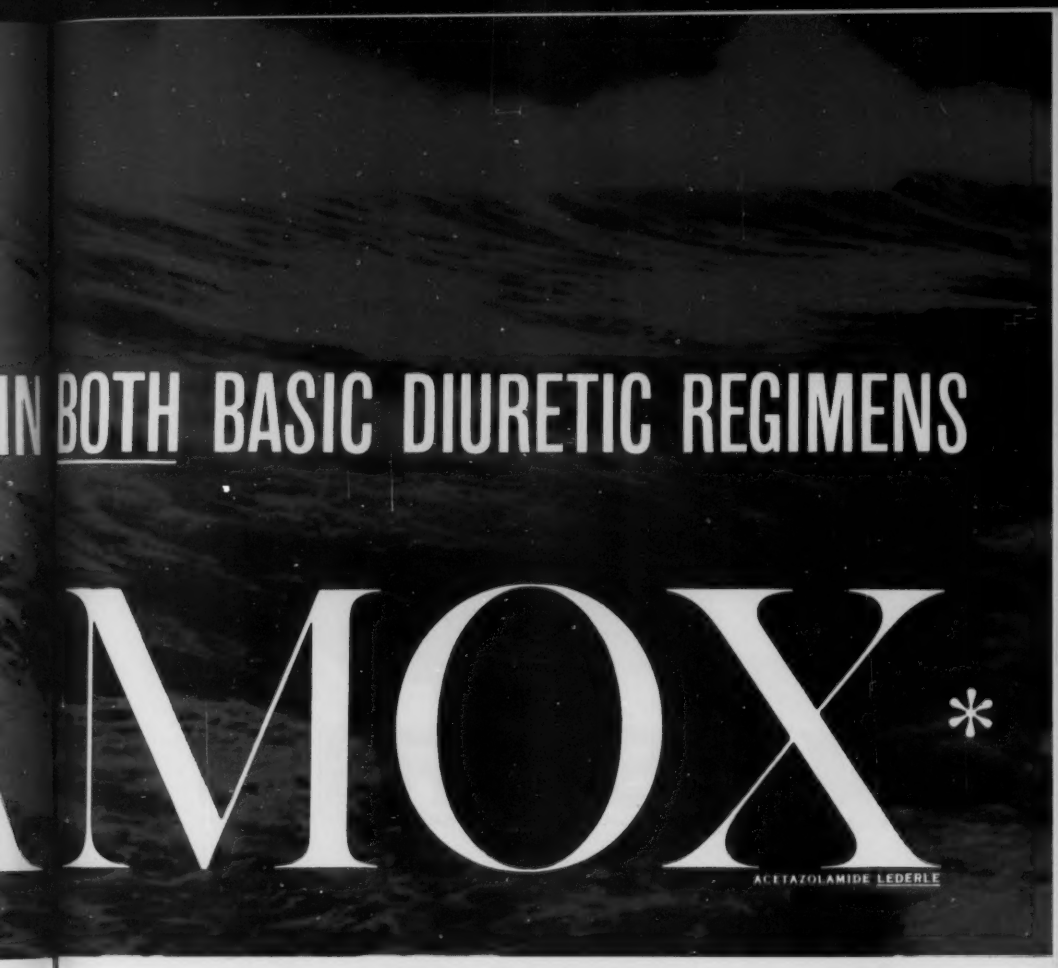



## HOW DIURETICS ACT

| | |
|---|---|
| Primarily by regulation of bicarbonate transport | DIAMOX acetazolamide |
| Primarily by regulation of chloride transport | mercurials chlorothiazide |

**LEDERLE LABORATORIES,** a Division of AMERICAN CYANAMID COMPANY, Pearl River, New York
*Reg. U. S. Pat. Off.

Lederle




**1** **Advantages of DIAMOX in single-drug diuresis**

DIAMOX—operating through the well-understood mechanism of *bicarbonate* transport regulation—provides ample, prolonged diuresis in the great majority of patients.

DIAMOX is virtually nontoxic . . . has not caused renal or gastric irritation . . . has no pronounced effect on blood pressure. It is rapidly excreted, does not accumulate in the body, permits convenient dosage adjustment, allows unbroken sleep. Small, tasteless, easy-to-take tablets . . . usual dosage, only one a day.

**CARDIAC EDEMA**

**PREMENSTRUAL TENSION**

**EDEMA OF PREGNANCY**

**OBESITY**

**2** **Advantages of DIAMOX in intensive, two-drug diuresis**

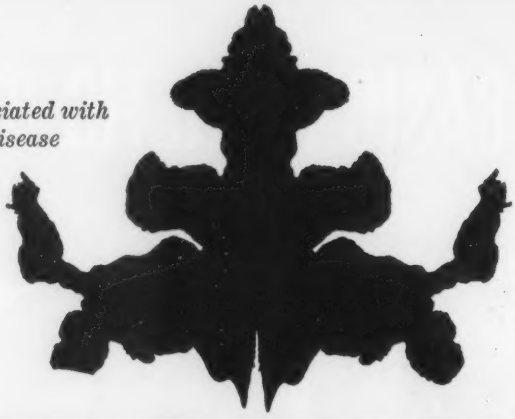
When intensive diuresis must be maintained, DIAMOX, alternated with an agent for regulation of *chloride* transport, has proved a regimen of choice. Through dual *bicarbonate-chloride* regulation, it produces maximal sodium-water excretion with minimal distortion of serum electrolyte patterns, greater patient comfort, lessened risk of induced drug resistance.

**ADVANCED CONGESTIVE HEART FAILURE**

**REFRACTORY TOXEMIA OF PREGNANCY**

**SQUIBB ANNOUNCES** a new, improved agent for better management of psychotic patients

- *schizophrenia*
- *manic states*
- *psychoses associated with organic brain disease*



# VESPRIN

Squibb Trifluprомazine 10-(3-dimethylaminopropyl)-2-(trifluoromethyl) phenothiazine hydrochloride

**Chemically improved** Modification of the phenothiazine structure potentiates beneficial properties . . . reduces unwanted effects

**Pharmacologically improved** Enhanced potency with far less sedative effect

**Clinically improved**

Does not oversedate the patient into sleepiness, apathy, lethargy

Drug induced agitation minimal

Active and rapid in controlling manic states, excitement and panic . . . in modifying the disturbing effects of delusions and hallucinations . . . in moderating hostile behavior . . . in facilitating insight

Intractable behavior patterns brought under control . . . patients made accessible to psychotherapy . . . nursing care reduced . . . social rehabilitation hastened

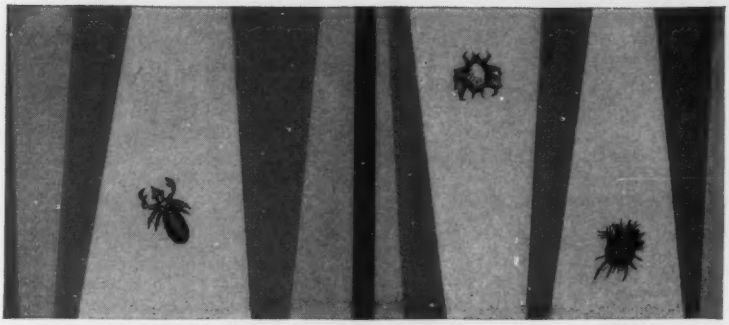
Effective dosage levels may be reached without development of side effects

*In extensive clinical experience—singularly free from toxicity:* Jaundice or liver damage—not observed / Skin eruptions—rare / Photosensitivity—rare / Hyperthermia—rare / Convulsions—not observed

*Dosage:* Usual initial dose, 25 mg. t. i. d., to be adjusted according to patient response. See literature.

Tablets of 10, 25 and 50 mg.

SQUIBB *Squibb Quality—the Priceless Ingredient*



# KWELL®

GAMMA BENZENE HEXACHLORIDE 1%

## new shampoo

ERADICATES PEDICULOSIS CAPITIS AND PUBIS IN 4 MINUTES

"A single shampooing sufficed to eradicate infestation . . . in all cases...in a few minutes."■

Gardner, J.: J. Pediat. 52:448 (Apr.) 1958.

SUPPLIED: KWELL Shampoo: bottles of 2 & 16 fl. oz.

## cream & lotion

IN SCABIES, CHIGGERS AND PEDICULOSIS

95% to 100% effective in 1 treatment — acts fast — non-irritating — nonstaining. ■

SUPPLIED: KWELL Cream: jars of 2 oz. & 1 lb. — KWELL Lotion: bottles of 2 & 16 fl. oz.

R&C **REED & CARNRICK** / Jersey City 6, New Jersey

....., 19.....

To The Association of Military Surgeons of the United States
Suite 718, New Medical Bldg., 1726 Eye Street, N.W.
Washington 6, D.C.

I hereby apply for MEMBERSHIP in THE ASSOCIATION OF MILITARY SURGEONS OF THE UNITED STATES, and enclose the sum of six dollars for my annual dues, including MILITARY MEDICINE. (Make checks payable to THE ASSOCIATION OF MILITARY SURGEONS, U.S.)

Name .....
(State both Christian and Surname in Full)

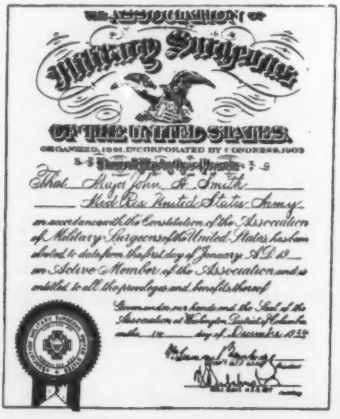
Title and Service .....

Address in full .....

Membership proposed by .....

.....

## Certificate of Membership in the Association




These certificates, suitable for framing, 9 by 12 inches in size, are handsomely engraved, on imitation parchment paper and will contain the engrossed name and rank of the member. They are supplied at a cost of $2.00 each, payable in advance.

## THE ASSOCIATION OF MILITARY SURGEONS OF THE UNITED STATES

*Organized in 1891*
*Incorporated by Act of Congress—1903*

### MEMBERSHIP ELIGIBILITY

Membership in the Association is open to:

a. Those who are or have been at any time commissioned officers (either Regular, Reserve, National Guard or U. S. Volunteers) or duly appointed fulltime civil members of the professional medical staffs of the Army, the Navy, the Air Force, the U. S. Public Health Service, the Veterans Administration, and the Bureau of Indian Affairs.

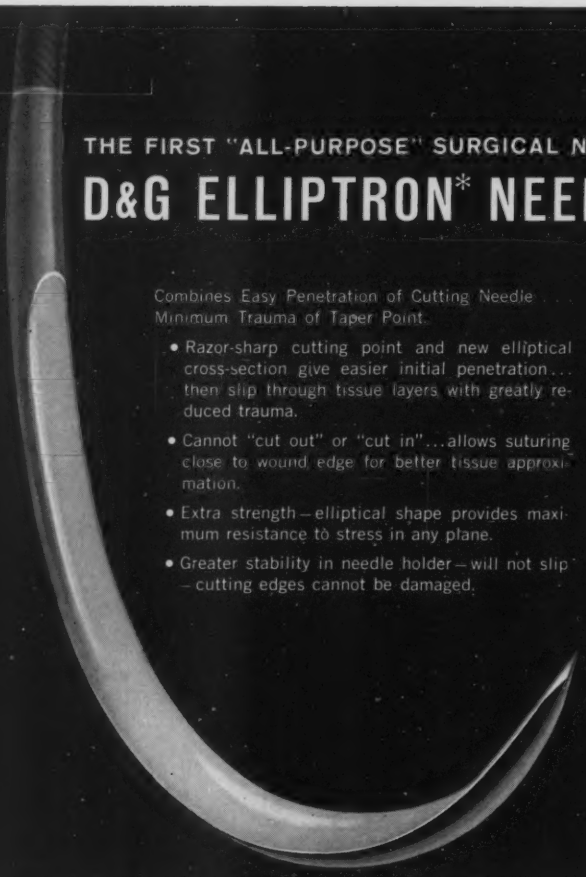
b. Officers of the Military Medical Services of other countries.

(Professional medical staffs include physicians, dentists, veterinarians, nurses, dietitians, occupational therapists, physical therapists and other allied medical professional personnel, including administrators.)

## ALPHABETICAL LIST OF ADVERTISERS

THE FIRST "ALL-PURPOSE" SURGICAL NEEDLE

# NEW D&G ELLIPTRON* NEEDLE



Combines Easy Penetration of Cutting Needle Minimum Trauma of Taper Point

- Razor-sharp cutting point and new elliptical cross-section give easier initial penetration... then slip through tissue layers with greatly reduced trauma.
- Cannot "cut out" or "cut in"...allows suturing close to wound edge for better tissue approximation.
- Extra strength – elliptical shape provides maximum resistance to stress in any plane.
- Greater stability in needle holder – will not slip – cutting edges cannot be damaged.

**Regular or inverted cutting needles tend to "cut out" or cut too deeply into tissue.**

**New razor-sharp D & G ELLIPTRON Needle penetrates easily, cannot cut out or cut in...gives surgeon complete control of needle path.**

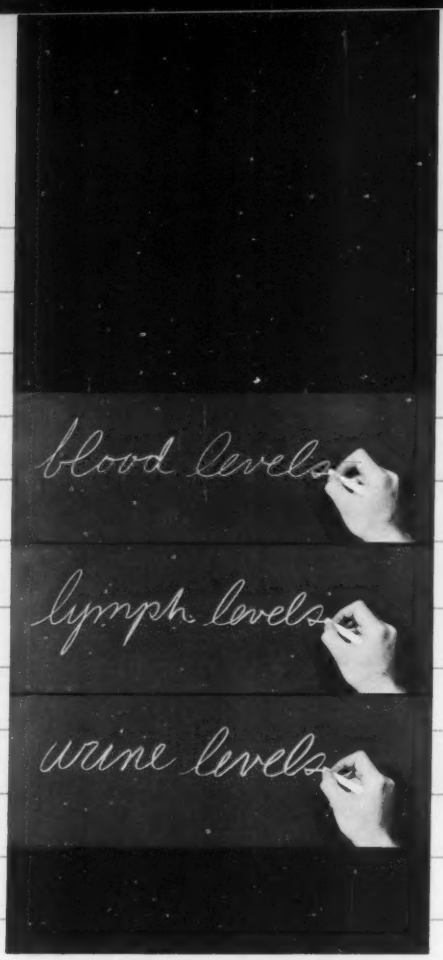
ALL ELLIPTRON Needle Sutures are supplied in the revolutionary D & G Surgilope SP* Sterile Strip Pack – the ultimate in safe, convenient suture packaging. Get full information from your SP[illegible] Representative, or write us direct.

CYANAMID

AMERICAN CYANAMID COMPANY
SURGICAL PRODUCTS DIVISION
DANBURY, CONNECTICUT

*Trademark Patent Pending

PRODUCERS OF DAVIS & GECK BRAND SUTURES AND VIM® BRAND HYPODERMIC SYRINGES AND NEEDLES
DISTRIBUTED IN CANADA BY
CYANAMID OF CANADA LTD., MONTREAL 16, P.Q.




Why Gantrisin?

Gantrisin provides not only adequate blood levels but therapeutically effective lymph and urine levels as well, for control of urinary tract infections. Gantrisin also offers the safety of almost complete systemic clearance after 24 hours.

# Gantrisin

ROCHE

Roche Laboratories
Division of Hoffmann-La Roche Inc.
Nutley 10, N. J.

GANTRISIN® — BRAND OF SULFISOXAZOLE

REFER TO PDR
PAGE 759

# GANTRISIN

## Highly soluble, single sulfonamide

**Description:** Gantrisin is a single sulfonamide (3,4-dimethyl-5-sulfanilamido-isoxazole) characterized by comparatively high solubility even in neutral or acid body fluids. It is especially soluble at the pH of the kidneys. It offers therapeutically effective lymph and urine levels, as well as adequate blood levels.

**Properties:** Gantrisin provides a wide antibacterial spectrum in systemic, localized and urinary infections. Because of its high solubility, Gantrisin does not require alkalinization and there is virtually no danger of renal blocking.

**Indications:** Systemic, localized and urinary infections due to both gram-negative and gram-positive organisms: streptococci, staphylococci, pneumococci, meningococci, H. influenzae, K. pneumoniae, E. coli, B. proteus, B. pyocyaneus (Pseudomonas aeruginosa), A. aerogenes, B. paracolon and Alcaligenes fecalis.

*For dosage and supply refer to PDR, page 759.*

# A DEMEROL® dosage form for every type of PAIN

**DEMEROL** HYDROCHLORIDE .... ***for prompt and prolonged control of severe pain***

**AMPULS** 1 cc. (50 mg.) 1.5 cc. (75 mg.) and 2 cc. (100 mg.)
**VIALS** 30 cc. (50 mg./cc.)
**TABLETS** 50 mg. and 100 mg.
**ELIXIR** (50 mg. per teaspoonful)

**A.P.C.** WITH **DEMEROL**.... ***for less severe pain***

**TABLETS** containing aspirin 200 mg.
phenacetin 150 mg.
caffeine 30 mg.
Demerol HCl 30 mg.

**DEMEROL** WITH **SCOPOLAMINE**.... ***for preoperative medication, obstetric analgesia and amnesia***

Each 1 cc. contains 50 mg. Demerol HCl and
0.2 mg. (1/300 grain) scopolamine HBr.

**DEMEROL** WITH **ATROPINE**.... ***for preoperative use, gastro-intestinal, biliary and renal colic, acute cardiospasm and pylorospasm***

Each 1 cc. contains 50 mg. Demerol HCl and
0.2 mg. (1/300 grain) atropine sulfate.

Winthrop LABORATORIES • NEW YORK 18, N. Y.

Subject to regulations of the Federal Bureau of Narcotics.

Demerol (brand of meperidine), trademark reg. U.S. Pat. Off.

*no. 1 in a series*
*of* **danger signals**
*in office practice*

# "NO NO NO NO"

*Stubborn negativism* in a hitherto agreeable patient may be the physician's first warning of mental or emotional disturbance. But progression to a more serious breakdown is not inevitable. The episode can often be aborted with early Pacatal therapy.

*More normal behavior* usually follows soon after Pacatal therapy is initiated while the patient remains fully alert. It is the absence of sedative action which distinguishes Pacatal from other ataractics and makes this drug particularly useful in office practice.

Pacatal is well tolerated. Side effects are few and generally mild. However, like all potent ataractic agents, Pacatal should be used with close supervision of the patient. Average dosage is 25 mg. three or four times daily. Complete literature available on request.

*Supplied:* 25 and 50 mg. tablets in bottles of 100 and 500. Also available in 2 cc. ampuls (25 mg./cc.) for parenteral use.

**WARNER-CHILCOTT**

*for normalization...not sedation*

*Pacatal is available under General Administration Contract GS-00S-3918.*

# Pacatal®

BRAND OF MEPAZINE

6784